THE IRON TRADE REVIEW

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Market Readjustment Is Swifter

Week Develops Sharp Declines in Many Lines as Buyers Hold Back—Coke Breaks $5 Per Ton—Independent Mills Touch Steel Corporation Schedule for First Time—Production Slows Down Further

PRICE declines are more general in the iron and steel market. In no week has the trend of the readjustment process been more pronounced than in the period just past. With few exceptions, virtually all lines beginning with coke and pig iron and running through to finished mill material, have yielded further to a condition of contracted buying and increased competition. In some products, the drop has been exceedingly abrupt. Accompanying the descent of the market, production has undergone additional curtailment through the slowing down of more mills and furnaces. In all respects, however, the movement has continued orderly and with a minimum of pessimistic sentiment.

All indications point to the fact that the recent retrenchment policy of the automobile industry has not brought the expected results. Further holdups of material have been served upon the mills by these consumers. One large builder has suspended a considerable tonnage of bars, sheets and strip steel, the latter amounting to 1400 tons, with valley producers. The Ford Motor Co. has dropped some men and has notified the mills that it proposes henceforth to carry only a 25-day stock of steel as against 60 to 75 days in recent months. On the other hand, farming implement manufacturers are going ahead on their season's production program with little change from that originally mapped out.

Rail prices for 1921 delivery are yet to be announced. The Reading has bought 15,000 tons of the Bethlehem Steel Co. with the price to be fixed later. The Pennsylvania lines east continue in the market for 100,000 tons. Price talk on rails by independent makers ranges from $59 to $65, mill.

Coke Market Breaks

In view of its influence upon iron and steel costs, especially pig iron, the outstanding news of the week has had to do with coke. The market in this fuel has broken sharply and the net drop in spot furnace coke in the week has been $5 per ton. Sales have been made at $11, ovens, and lower is reported to be possible. The recent top of the spot market was over $20, ovens. The collapse of the market is attributed to the sudden reduction of consumption caused by the blowing out of a number of blast furnaces. Coke operators in the Connellsville district have effected some curtailment of output by putting out a number of ovens but the market remains weak.

Mills Seek Orders

For the first time in more than a year, quotations of independent steel producers, in a few cases, now have fallen back to the minimum level steadily maintained by the Steel corporation. In the Cleveland district this week, 2.65c, Pittsburgh, on plates and a base of 2.35c on forging bar business appeared. As yet these are isolated incidents since the general level of the independent producers still is considerably above that of the leading interest. At the same time, the trend is distinctly downward. In plates business is being taken openly at 3.00c, base Pittsburgh. At New York, 2.90c, base Pittsburgh, has been quoted to two large buyers. Elsewhere, it is intimated, 2.85c would be acceptable on an attractive lot. The common figure on steel bars now is 3.25c, Pittsburgh. The structural shape market is indefinite though soft. Sheets are lower and makers are more aggressive for new orders. A Pittsburgh independent mill has reduced rerolling billets $5 to $55. Sheet bars have been sold at the same figure. Tubes are the strongest item in the whole list of finished products.

Pig Iron Is Softer

Led by another abrupt decline in basic, the pig iron market presents a soft appearance. On sales of 5000 and 1500 tons for this year's delivery at Pittsburgh, basic has dropped $4 further to $40, valley. It is reported a valley steelmaker will accept less for this grade. Bessemer continues to be offered by producers at $47, valley, without attracting buyers. Foundry iron with small sales moving continues unchanged though untested at $47, valley. Virginia furnaces have sold $1 or more lower. Eastern Pennsylvania prices show a wider spread. The Illinois Steel Co. has opened its books to its regular customers for first quarter at $39, furnace base. This is the same figure named on last quarter business.

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Business Sentiment Is Wholesome

HOW truly great and influential the American Iron and Steel institute has become among the business organizations of the country again was demonstrated at the annual fall meeting in New York last week. The attendance exceeded all records and at the banquet the number present was so large that it taxed the capacity of New York's largest facilities for such an affair. This fact called forth from Judge Gary who presided the remark that the institute was at a loss to know what it should do in the future to accommodate those who were desirous of attending its various sessions. This brings up again the question previously raised that at some future time it may be desirable as well as practicable for the institute to establish permanent quarters of its own wherein its organized work may be centered and its annual meetings may be held.

Since the institute essentially is a business organization the meeting, in a large way, afforded a cross section of the representative business sentiment of the country under the present unsettled conditions. This sentiment may be crystallized into one of confidence in the fundamental soundness of underlying conditions and one of hope that a period of substantial prosperity awaits upon the completion of the present process of readjustment. Judge Gary apparently was addressing an appreciative audience when he said that the hour is one when price reductions must be made freely and cheerfully where necessary and as costs will permit. Mr. Schwab in his remarks also laid weight upon the question of costs. This emphasis upon the factor of costs points out the path along which future market conditions may be expected to travel. Manufacturing costs in iron and steel have been abnormally high for some time. Any readjustment which can effect a reduction of present costs therefore would be a salutary development, and should accompany any lowering of mill and furnace prices if a permanent improvement in the situation is to be brought about. That such a leveling off process is at work is shown this week by the abrupt break in the abnormal market which has prevailed in coal and coke. Coke probably has been selling at the most excessive prices of any of the raw materials of iron and steel.

As an expression of the leading business thought of the country, the meeting of the American Iron and Steel institute reflected a sound and wholesome attitude. It demonstrated that those who are molding the policies of the country's greatest manufacturing industry are alive to their part in the present stepping-down process and that they are ready to perform it cheerfully, with full appreciation of their great influence as well as of their equal responsibility.

Immigration Laws Need Revision

CALLING of a conference next month by the chairman of the house committee on immigration for the purpose of considering restrictive immigration legislation is commendable and will have the earnest support of all thinkers upon the problem of the alien. Yet it is not amiss to warn that hopes should not be built too high on the passage of any immigration bill in the immediate future. The coming session is the short one, convening Dec. 6 and adjourning March 4. Much time will be consumed in discussion of the appropriation measure. In all probability, immigration bills will be sidetracked for consideration of new taxing measures and possibly a revision of the Jones shipping act. With a change of administration pending and contending parties more or less belligerent, the coming session, many fear, will be long on verbiage but short on results.

It becomes more and more apparent that the national laws on immigration must be recast. Thus far all agree. Employers, taken as a class, are supposed to favor a free flow of aliens in order to fill the war-drained reservoir of common labor and thus lower high wage costs. Labor, on the other

hand, is credited with the demand that immigration shall be restricted in order that high wage levels may be maintained, and that the few aliens permitted to filter through Ellis island will be diverted to the rural districts. No doubt both positions have been overdrawn. There is a real need for the immigrant, and in bettering himself he can at the same time provide the unskilled labor so badly needed in various sections of the country.

At the same time, it does not require great perception to grasp that the security of the country demands the undesirable alien shall be barred absolutely. The least the country expects of congress, either at the coming session or the next one, is that those of this type shall be turned back. When it comes to any drastic prohibitory measures however which would tend to bar the alien as a class, in order to please the labor unions, this is an unwarranted interference with a fundamental economic situation and it will not be countenanced by the country at large.

Great Britain's Problem Is Ours

THE sudden development of the British coal crisis has brought our own coal problem again into the limelight. The situation is supremely serious whether regarded as a purely national matter or as a world problem. What the authorities at Washington realize the gravity of the situation is seen in the fact that they have ordered a survey designed to indicate the extent of stocks now available. At first consideration the present condition in this country is encouraging. The output is more than 51,000,000 tons ahead of the corresponding figures for 1919, although still somewhat behind 1917 or 1918. Statistics, however, are not always to be taken at their face value. Assuming that the output at the mines is adequate for the nation's needs, there are still two factors to be considered. One is the transportation question within the country and the other the minimum requirements of foreign countries. Transportation all along has been a prime factor in the acute coal situation.

Any prolongation of the British coal strike forecasts a keen competition for coal for export. If this develops to any extent, and already indications point that way, coal prices probably will advance with their attendant inconvenience and suffering upon all users. As prices advance here they will be lifted correspondingly in Europe. Even with the urgent demand, excessive prices will tend to limit the amount which Europe will be willing to take. At any rate the quantity of coal which can be exported from this country is limited and for a considerable time, at least, it could not greatly relieve the result of a continued complete cessation of English mining operations. Such an extended cessation is by no means certain according to the latest cable advices.

In order to counteract the tendency toward advancing prices in this country the first thought is that of an embargo on outgoing coal. Whether this would have the desired result or not, however, is a matter of some doubt. On the other hand is the more important consideration of our obligations toward Europe. The problem in Great Britain is also the problem of America. It is a time when calm decisions on the part of those in control of the coal industry of this country will go a long ways toward weathering any storm. What is needed is economy and careful distribution of coal in this country together with prevention of hoarding and the straining of every effort to export as large a tonnage as possible without undue hardship at home. These, combined with a broad-gaged attitude on the part of coal interests toward keeping prices down, would go a long ways in preventing suffering and disaster in Europe as well as in the United States and in addition will be helping to combat a dangerous and unwarranted exercise of union power.

Iron and Steel Output at High Rate

IN THE total of both pig iron and steel ingots produced, September, although a 30-day month, stands third during the calendar year of 1920 to date. On an average daily basis, the production of ingots and pig iron ranked the second highest for the year. The March output of both products continues to stand as the high mark. Acute transportation conditions and the inability to secure adequate fuel supplies were responsible for a greatly restricted operation and production during the several mid-year months.

With railroad shipments materially improved, and with coal supplies moving more freely from the mines, production of iron and steel again is on the upgrade toward a normal basis. Explanation of the gain in the daily rate of pig iron output in September is to be found in the fact that on Sept. 30, 317 stacks were in operation. This is the highest number producing since January, 1919, when 330 furnaces were in blast. This represents a gain of 11 furnaces over August, nine of which were of the nonmerchant or steelmaking class.

From present indications the output of iron and steel for the remaining three months of the year bids fair to continue at a high rate. October's production of pig iron will bring the nine months' total up to the figures for all of 1919. Thus conceivably the 1920 total may exceed last year's by over 6,000,000 tons since present output is around 3,000,000 tons a month. The total ingot production of the country for the nine months to date is approximately 31,000,000 tons compared with 33,694,795 tons in all of 1919. Thus the 1920 figure may exceed the 1919 total by over 7,000,000 tons if the present rate is maintained. Changing trade conditions which have become more marked in recent weeks, of course may modify the final showing for the year.

Iron and Steel Prices

CORRECTED TO WEDNESDAY NOON—SCRAP, WAREHOUSE, ORE AND OTHER PRICES ON PAGES 1236 AND 1240

Pig Iron

Bessemer, valley	$47.00
Bessemer Pittsburgh	48.96
Basic, valley	40.00
Basic, Pittsburgh	41.96
Basic, Buffalo	39.00
Basic, delivered, eastern Pa.	51.00 to 51.50
Malleable, valley	47.50
Malleable, Pittsburgh	49.46
Malleable, Chicago, furnace	46.50
Malleable, Buffalo, furnace	51.25
Malleable, delivered, eastern Pa.	47.00 to 52.50

FOUNDRY IRON SILICONS

No. 2 Northern	1.75 to 2.25
No. 2 Southern foundry	1.75 to 2.25
No. 2X Eastern and Virginia	2.25 to 2.75
No. 1X Eastern	2.75 and up
No. 1 Chicago	2.25 to 2.75
No. 2 foundry Eastern	1.75 to 2.25

No. 1X, eastern delivered Phila.	$50.50 to 54.50
No. 1X, Buffalo	53.00
No. 1 foundry, Chicago furnace	48.25
No. 2 foundry, valley	47.00
No. 2 foundry, Pittsburgh	48.96
No. 2 foundry, Buffalo	50.00
No. 2 foundry Chicago furnace	46.00
No. 2 foundry, Ironton furnace	45.00 to 46.00
No. 2 foundry, Cleveland furnace	47.00
No. 2X, eastern delivered Phila.	49.50 to 52.75
No. 2X, eastern N. J., tidewater	49.75 to 52.75
No. 2X, eastern del. Boston	56.06 to 58.06
No. 2X, foundry, Buffalo furnace	51.25
No. 2 X, Buffalo del. Boston	55.71 to 56.71
No. 2 foundry del. Philadelphia	48.50 to 51.50
No. 2 foundry N. J., tidewater	48.75 to 51.50
No. 2 southern, Birmingham	42.00
No. 2 southern, Cincinnati	46.50
No. 2 southern, Chicago	48.66
No. 2 southern, Phila.	50.66
No. 2 southern, Cleveland	48.66
No. 2 southern, Boston	52.67
No. 2 southern, St. Louis	47.74
No. 2X, Virginia furnace	46.75 to 49.25
No. 2X, Virginia, Philadelphia	51.99 to 53.99
No. 2X, Virginia, Jersey City	52.41 to 54.41
No. 2X, Virginia, Boston	52.51 to 55.51
Gray forge, valley, Pittsburgh	47.96
Gray forge, eastern Pa.	46.00 to 50.10
Low phosphorus, standard, valley	56.00 to 58.00
Low phosphorus, standard, Phila.	65.32
Low phosphorus, Lebanon furnace	57.00
Charcoal, Superior, base, Chicago	58.50

Silvery Iron

8 per cent base at furnace

Jackson County, Ohio	$60.00
Tennessee, Chicago delivery	62.53
Ohio brands, Chicago	65.07

Bessemer Ferrosilicon

Jackson County, Ohio, furnace

10 per cent	$69.50
11 per cent	72.80
12 per cent	76.10

Coke

Connellsville furnace	$11.00 to 12.00
Connellsville foundry	15.00 to 16.00
Pocahontas furnace	14.50 to 15.00
Pocahontas foundry	15.00 to 15.50
New River furnace	16.50 to 17.00
New River foundry	16.50 to 17.00
Wise county furnace	15.50 to 16.50
Wise county foundry	17.00 to 17.50

Ferroalloys

Ferromanganese, 80 per cent, c.i.f. Atlantic ports, domestic metal	$170.00
Ferromanganese, 80 per cent, English, c.i.f. Atlantic ports	135.00 to 160.00
Spiegel, 18 to 22 per cent furnace spot	80.00 to 82.50
Ferrosilicon, 50 per cent, spot and contract, delivered	82.50 to 85.00
Ferrotungsten, standard, per pound contained	75c to 85c
Ferrochrome, 60 to 70 per cent chromium, 6 to 8 per cent carbon, per pound contained, maker's plant	18.00c to 19.00c
Imported ferrochrome, 6 to 8 per cent carbon	16.50c to 17.00c
Ferrovanadium, 30 to 40 per cent per pound contained, according to analysis	$6.50 to 9.00
Ferro carbon-titanium, carloads, producers plant, per net ton	$200.00

Semifinished Material

BILLETS AND BLOOMS
(4 x 4 inch)

Open-hearth, Pittsburgh	$55.00 to 60.00
Open-hearth, Youngstown	55.00 to 60.00
Open-hearth, Philadelphia	60.74
Bessemer, Pittsburgh	55.00 to 60.00
Bessemer, Youngstown	55.00 to 60.00
Forging, Pittsburgh	65.00 to 70.00
Forging, Philadelphia	70.74

SHEET BARS

Open-hearth, Pittsburgh	$55.00 to 60.00
Open-hearth, Youngstown	55.00 to 60.00
Bessemer, Pittsburgh	55.00 to 60.00
Bessemer, Youngstown	55.00 to 60.00

SLABS

Pittsburgh and Youngstown	55.00 to 60.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$75.00
Grooved skelp, Pittsburgh	3.25c
Sheared skelp, Pittsburgh	3.25c

Shapes, Plates and Bars

Structural shapes, Pittsburgh	2.45c to 3.10c
Structural shapes, Philadelphia	2.80c to 3.35c
Structural shapes, New York	2.83c to 3.38c
Structural shapes, Chicago	2.83c to 3.38c
Tank plates, Pittsburgh	2.65c to 3.00c
Tank plates, Chicago	3.03c to 3.38c
Tank plates, Philadelphia	3.00c to 3.35c
Tank plates, New York	3.03c to 3.38c
Bars, soft steel, Pittsburgh	2.35c to 3.25c
Bars, soft steel, Chicago	2.73c to 3.63c
Bars, soft steel, New York	2.73c to 3.63c
Bars, soft steel, Philadelphia	2.70c to 3.60c
Bar iron, common, Phila.	4.60c to 4.85c
Bar iron, common, Chicago	3.75c to 4.00c
Bar iron, common, Cleveland	3.75c to 4.00c
Bar iron, common, New York	4.63c to 4.88c
Bar iron, common, Pittsburgh	4.75c to 5.00c
Hard steel bars, Chicago	3.75c to 4.00c

Rails, Track Material

Standard bessemer rails, mill	$45.00 to 60.00
Standard open-hearth rails, mill	47.00 to 62.00
Relaying rails, light, St. Louis	40.00 to 45.00
Relaying rails, Pittsburgh	50.00 to 55.00
Angle bars, Pittsburgh base	3.00c to 4.00c
Angle bars, Chicago base	2.75c
Light rails, 25 to 45, mill	2.75c to 3.25c
Spikes, railroad, Pittsburgh	4.00c to 4.25c
Track bolts, Pittsburgh	6.00c to 6.50c
Track bolts, Chicago	4.98c to 6.38c
Track spikes, Chicago	4.63c
Tie plates, Chicago	3.00c to 3.50c

Wire Products

(100 lbs. to jobbers, carloads; retailers, 5c more)

Wire nails, Pittsburgh	$3.25 to 4.50
Plain wire, Pittsburgh	3.25 to 4.00
Galvanized wire, Pittsburgh	3.95 to 4.70
Barbed wire, painted, Pittsburgh	3.65 to 4.15
Barbed wire, galvanized, Pittsburgh	4.35 to 5.10
Polished staples, Pittsburgh	3.65 to 4.15
Galvanized staples, Pittsburgh	4.35 to 5.10
Coated nails per count keg, Pitts.	2.85 to 4.10

Chain, Piling, Strip Steel

Chain, 1 in. proof coil, Pitts.	7.25c
Sheet piling, base, Pittsburgh	3.25c to 4.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.25c to 8.50c.

Sheets

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	4.35c to 7.00c
No. 28, bessemer, Pitts.	4.35c to 7.00c
No. 28, open-hearth, Chi.	4.74c to 7.39c
No. 28 Philadelphia	4.70c to 6.85c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	4.35c to 7.00c
No. 28, bessemer, Pitts.	4.35c to 7.00c

GALVANIZED

No. 28, open-hearth, Pitts.	5.70c to 8.25c
No. 28 bessemer, Pitts.	5.70c to 8.25c
No. 28, open-hearth, Chi.	6.08c to 8.63c
No. 28, open-hearth, Philadelphia	6.05c to 8.35c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	3.55c to 5.25c
No. 10, bessemer, Pitts.	3.55c to 5.25c
No. 10, open-hearth, Chi.	3.95c to 6.35c
No. 10, open-hearth, Phila.	3.90c to 5.85c

Full sheet schedule page 1240.

Tin Plate

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.00 to $8.50

Iron and Steel Pipe

Base Discounts Pittsburgh to Jobbers Carloads

	Black	Galv.
¼ to 3 in., butt steel	54 to 57½	40½ to 44
¼ to 1½ in., butt, iron	24½ to 34½	8½ to 18½

Full pipe schedule page 1240.

Boiler Tubes

Steel, 3½ to 4½ inches, c. l.	20 to 40½
Iron, 3½ to 4½ inches, c. l.	list to 11 off

Cast Iron Water Pipe

Without War Freight Tax
(Class B Pipe)

Class A pipe is $2 higher than Class B

Four-inch, Chicago	88.10
Six-inch and over, Chicago	83.10
Four-inch, New York	87.22
Six-inch and over, New York	77.22
Four-inch, Birmingham	79.00 to 83.00
Six-inch and over, Birmingham	74.00 to 78.00

Hoops, Bands, Shafting

Hoops, Pittsburgh	3.05c to 5.00c
Bands, Pittsburgh	3.05c to 5.00c
Hot rolled strip steel, Pitts. stamping quality	5.50c

Cotton ties, 3000 bundles and over $2.06 to $2.51 per bundle mill, October basis, with 1½c per bundle per month carrying charge.

Rivets

Structural rivets, Pittsburgh	4.75c
Boiler rivets, Pittsburgh	4.85c
Rivets ⅞ in. and smaller, Pitts.	40 to 40-10 off

Nuts and Bolts

(Prices f.o.b. Pittsburgh)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	30-10 to 20-10 off
Cut thread	30 to 20 off
Larger and longer	25 to 20 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	40-5 to 25-10 off
Cut thread	30-10 to 25 off
Larger and longer	30 to 25 off
Plow bolts Nos. 1, 2 and 3 heads	35 to 25 off
Other style heads	20% higher
Stove bolts in packages	60-10 off
Stove bolts in bulk	60-10-2½ off to 2½ off
Cold pressed semifinished hexagon nuts ⅜ in. and larger	30-10 to 40 off
Cold pressed semifinished hexagon nuts ⅞ in. and smaller	50-10 to 40 off
Gimlet and cone point lag screws	40-5 to 40 off

NUTS

(Up to 1¼ and 1½ inches inclusive)

Hot pressed, square blank	$0.50 to $1.50 off
Hot pressed, square tapped	$1.00 off list
Hot pressed, hexagon, blank	$0.50 to $1.50 off
Hot pressed, hexagon tapped	list
Cold pressed, square tapped	$1.00 off to $1.00 on
Cold pressed, square tapped	$1.50 off to $1.00 on
Cold pressed, hexagon tapped	$1.50 off to $1.00 on
Cold pressed, hexagon blank	$1.00 off to $1.00 on

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Prices Present and Past

Representative market figures yesterday, one month ago, three months ago and one year ago

Prices given in this table are those ruling on the largest percentage of sales, at the dates named

	Prices Oct. 27, 1920	Average prices Sept., 1920	July, 1920	Oct., 1919
Bessemer, valley, del., Pittsburgh	$ 48.96	$50.46	$46.80	$29.35
Basic, valley, delivered, Pittsburgh	41.96	50.46	47.40	27.15
*No. 2 Foundry, val. del. Pittsburgh	48.96	49.36	46.40	28.85
*No. 2 Foundry, Chicago, furnace	46.00	46.09	44.40	27.55
Lake Superior charcoal, Chicago	58.50	58.30	57.50	33.15
Malleable, valley	47.50	50.50	44.80	29.15
Malleable, Chicago	46.50	46.50	44.90	28.00
*Southern, No. 2, Birmingham	42.00	42.00	42.30	27.45
*Southern Ohio, No. 2, Ironton	46.00	46.80	44.00	28.80
Basic eastern, del. eastern Pa.	51.25	51.65	44.25	27.90
**No. 2X, Virginia, furnace	48.25	50.25	44.75	30.35
**No. 2X, eastern del., Philadelphia	52.25	53.75	48.10	32.00
Gray forge, valley del., Pittsburgh	50.96	50.95	45.40	27.65
Ferromanganese, 80 per cent, tidewater	170.00	170.00†	200.00†	110.00†
Sheet bars, bessemer, Pittsburgh	60.00	68.50	70.00	43.20
Sheet bars, open-hearth, Pittsburgh	60.00	68.50	75.00	43.20
Billets, bessemer, Pittsburgh	55.00	60.00	65.00	39.30
Billets, open-hearth, Pittsburgh	55.00	60.00	65.00	39.30
Steel bars, Pittsburgh	3.25	3.25	3.25	2.35
Steel bars, Chicago	3.63	3.93	3.53	2.62
Iron bars, Philadelphia	4.60	4.85	4.50	2.745
Iron bars, Chicago mill	$ 3.75	$ 3.75	$ 3.75	$ 2.70
Beams, Chicago	3.48	3.63	3.52	2.72
Beams, Pittsburgh	3.10	3.10	3.25	2.45
Beams, Philadelphia	3.35	3.57	3.50	2.693
Tank plates, Pittsburgh	3.00	3.50	3.30	2.65
Tank plates, Chicago	3.38	3.88	3.77	2.69
Tank plates, Philadelphia	3.35	3.75	3.75	2.895
Sheets, blk., No. 28, Pittsburgh	7.00	7.00	7.00	4.35
Sheets, blue anld., No. 10, Pittsburgh	5.00	5.00	5.00	3.55
Sheets, galv., No. 28, Pittsburgh	7.50	7.50	7.50	5.70
Wire nails, Pittsburgh	4.00	4.00	4.00	3.25
Connellsville furnace coke	11.00	16.90	15.30	4.15
Connellsville foundry coke	15.00	17.90	16.10	5.60
Heavy melting steel, Pittsburgh	28.00	28.00	25.70	20.00
Heavy melting steel, eastern Pa.	22.25	20.40	22.00	19.55
Heavy melting steel, Chicago	20.50	24.20	23.70	18.80
No. 1 wrought, eastern Pennsylvania	27.50	34.40	33.50	27.00
No. 1 wrought, Chicago	21.50	27.50	28.10	22.00
Rerolling rails, Chicago	31.00	38.50	34.90	26.80

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon. †delivered.

Pig Iron Market Moving Lower

Basic Tonnage Sold at $40 Valley—Bessemer Offered at $47 Valley Without Buyers —Foundry Grade Untested—Virginia and Eastern Pennsylvania Irons Are Easier—Shipments Slower—Some Furnaces Blowing Out

Philadelphia, Oct. 26.—Pig iron sales in western Pennsylvania continue in small volume. Foundry iron prices are somewhat lower, makers selling No. 2 X (2.25 to 2.75 silicon) at prices ranging from $48 to $51 eastern Pennsylvania furnace and No. 2 plain (1.75 to 2.25 silicon) $1 lower. Some resales of No. 2X have been made at $48 to $49 eastern Pennsylvania furnace. Resale offerings of eastern Pennsylvania foundry iron are less abundant than those from other districts since eastern Pennsylvania makers have been handicapped right along in making shipments and hence consumers not so well supplied. Virginia furnaces have sold some tonnage for this year at $47 base furnace. The usual price on resale Virginia iron is $46 base while a little has been sold at $45. The minimum asking price of central Pennsylvania makers is $48 base furnace. There are some resale offerings of central Pennsylvania foundry iron at $47 base. For 1921, furnaces are cautious due to uncertainty as to what coke will do for first half but if costs continue as at present and selling prices recede, many furnaces undoubtedly will blow out. Where furnaces are getting coke on $8 to $10 contracts, cost of producing pig iron in eastern Pennsylvania is said to average from $40 to $42. However, about one-third of eastern makers have been depending on spot coke and the costs of these furnaces are averaging from $47 to $50. Very few stacks have order books averaging higher than $42 per ton and a number average less. In view of the tendency to ship higher priced orders first, the average price on unfilled tonnage is tending to decrease.

Two Levels at Chicago

Chicago, Oct. 26.—Pig iron quotations in this market appear to be on two levels from $2 to $3 apart. One is the quotation maintained by furnaces at which sales are being made occasionally for spot delivery and the other is for resale iron which is being offered liberally and some of which is moving. Northern furnaces maintain $46, furnace, for foundry iron, 1.75 to 2.25 silicon, while the same material on resale offers may be taken at $43 to $45, Chicago. Southern furnaces are nominally at $42, Birmingham, for 1.75 to 2.25 silicon, with resale lots offered at $40 to $41, Birmingham. In spite of the considerable tonnage of iron available at secondhands, producers continue to book small lots for prompt delivery at full furnace price. The effect of the resale offerings apparently is more to restrict inquiry to the furnaces than to influence their prices. In spite of the quiet situation, for there is practically no inquiry appearing, no indications are present that foundries are consuming less iron, and producers are shipping their entire output. Buyers appear to be in the mental condition of not desiring to contract for anything, and a change in prices apparently would not alter this determination. Although only 60 days remain of the present year, and practically no buying has been done for 1921 delivery, furnace interests are not worried over the situation as they have booked enough tonnage into next year to make them comfortable. On silveries a Tennessee furnace will take tonnage at $55, furnace, for 8 per cent, while Jackson county producers continue to quote $60. No resale material of this sort is known to be on the market. Two inquiries for spot low phosphorus iron, one for 100 tons and the other for 200 tons have been put out recently. An eastern producer is quoting $57, furnace, while an Ohio producer names the same figure at its furnace.

Action of the Illinois Steel Co. in opening its books for first quarter delivery to regular customers at $39, furnace, has resulted in practically all its regular patrons taking about their usual tonnage. None of this iron was available for any outside buyer, and the alacrity with which the small tonnage was taken up indicates the price is considered fair for that delivery.

Resales at $45 to $47 Furnace

New York, Oct. 25.—Eastern Pennsylvania pig iron producers continue to have difficulty in making shipments on contracts due to the revival of the interstate commerce commission's coal car order. These furnaces also continue to have trouble to get enough coke, so that in some cases they are depending on day to day receipts to support production. On the whole, the statistical condition of the pig iron market continues satisfactory.

New business is of small proportions and resales comprise the bulk of it. Resale foundry iron has been disposed of during the past week from $45 to $47, base, furnace, and resale foundry from Virginia, eastern Pennsylvania and Buffalo, has gone at this level. Sales by the furnaces are very few in number and small in total. Included in such sales during the past week has been some Virginia foundry for shipment this year. The market on Virginia foundry now may be quoted at $47 to $48, base, furnace. Eastern Pennsylvania makers continue to adhere to $50 and $51, furnace, base.

In central Pennsylvania, the minimum appears to be $48, base. None of the Buffalo makers yet has expressed any willingness to do any less than $50, base, Buffalo. Inquiries for 3000 tons

of foundry came out during the past week but were withdrawn.

Business of the past week included some eastern Pennsylvania gray forge at $48, furnace, and some malleable at $51, eastern Pennsylvania furnace. These sales were made at first hand. No business has developed as yet with respect to export inquiries which came out recently. The Topton furnace in eastern Pennsylvania is out of blast owing to lining trouble.

Reselling Continues

Boston, Oct. 25.—In the absence of orders, nearly all eastern furnaces are maintaining the prices established earlier in the season. In most cases such prices are only nominal, as the market is on a $3 to $5 lower level. Transactions in resale iron continue to constitute the bulk of the New England trading at present. Almost every day sees new tonnages offered by overstocked foundries or by dealers acting as consumers' agents. Sales reported range from carload to 300 or 400 tons, and probably aggregate 3000 or 4000 tons. Several sales indicate that a base price figured on an eastern Pennsylvania furnace level of $45 represents the resale market in New England. This is equivalent to a delivered price of about $50 for No. 2X (2.25 to 2.75 silicon). Those familiar with the eastern furnace situation look for lower levels before there is more buying for next year. Direct furnace sales during the week have been almost negligible. An eastern Canadian consumer placed an order with a northern furnace for some charcoal iron at $46, furnace, or $59, delivered. Birmingham interests obtained a few small orders on a $42 base, or approximately $50, delivered on docks at Boston. Some of the larger consumers have been investigating the market for first half iron.

Undoubtedly there are consumers who feel a little anxious over not having covered for delivery beyond Jan. 1.

Basic At $40 Valley

Pittsburgh, Oct. 26.—The market for standard basic pig iron is established at $40, valley. It has settled at this level for the present at least as the result of two important direct sales the latter part of last week by a valley furnace. One lot involved 5000 tons for November shipment to a Mahoning valley steel works and the other 1500 tons for a nearby steel interest for prompt delivery. A steelworks stack is said to be offering basic at less than $40. Negotiations for other grades of iron have been either extremely small or entirely absent so that the market position remains indefinite. It has been evident for some time that the basic market was receding to the level of $40 and it has been hastened in this direction by reason of large offerings and sizable sales of resale tonnages and there still is a good sized lot being offered in the market. While some furnace interests express the opinion that $40 is the minimum level for basic over the remainder of the year others seriously doubt this and think a still further market decline is in prospect and based their belief largely on the fact that the market for furnace coke has broken so sharply. So far as reported there has been no dealing in bessemer or gray forge iron during the past week, but limited sales of low phosphorous iron and of No. 2 foundry iron (1.75 to 2.25 silicon) have been made, the former at $58, valley, and the latter at $45, valley, or $2 ton under the prevailing foundry iron quotation. A nearby furnace is offering a round lot of gray forge at $44 furnace, but it is evident that a lower figure will have to be quoted in order to attract business. Another furnace is quoting bessemer iron in 1000 ton lots at $47 valley, but this level also undoubtedly would have to be shaded considerably and perhaps would be by the buyer upon receipt of a firm offer. Production of pig iron has been severely curtailed, due to a lack of demand, lighter output of steel and high prices of coke, with the result that the latter are receding rather swiftly. The Shenango Furnace Co. has banked its stack No. 4; at the end of the current week Alice furnace of the Valley Mold & Iron Corp. will be banked and three steel works stacks in the valley, have been banked in the past week. Nearby furnaces that have been down for sometime include Fanny of the Hanna Furnace Co. at West Middlesex, Pa., the furnace of the Perry Iron Co., Erie, Pa. It is understood that the Pittsburgh Crucible Steel Co. soon will blow out its No. 2 furnace at Midland, Pa., for relining leaving its new furnace there in blast. The Carnegie Steel Co. has made no gain in its activities of blast furnaces, still having 40 blowing.

Sell 7000 Tons of Foundry

Buffalo, Oct. 26.—One furnace interest last week sold 5000 tons of foundry at regular prices for delivery over the first half of 1921. This tonnage represented aggregate bookings and was distributed among several customers. Another interest reports the sale of 2000 tons of foundry at the same figure for delivery over November and December. By regular price is meant $50 for No. 2 plain (1.75 to 2.25 silicon); $51.25 for No. 2X (2.25 to 2.75 silicon) and $53 for No. 1X (2.75 to 3.25 silicon). A malleable sale of 800 tons and another of 200 tons, both at $51.25 is reported. A 500-ton malleable inquiry is now before the market. Demand for foundry from Canada aggregates between 1500 and 2000 tons. Resale iron continues to figure in the trading here and it is known that some foundry was sold as low as $45. Makers claim this iron is only being taken in small lots and that it does not represent the market. The resale iron disposed of in this territory in the past two months has reached considerable proportions when reckoned in the aggregate. Merchant furnaceman state that there is no weakening of their prices at any point. Two furnaces are well sold up for first quarter, while two others have taken only a little 1921 tonnage.

Few Sales Are Made

Cleveland, Oct. 26.—Complete indifference toward further purchases of pig iron at this time continues to be shown by consumers. Sales in the week have amounted to only a few hundred tons. Where inquiries invariably small have been put out by the buyer, the usual quotation is $46 to $47 base. On one sale of 250 tons for shipment this year was made during the week by a valley maker at this figure. A Michigan melter bought 2000 tons of foundry iron for first quarter from a lake furnace, prices to be fixed at time of shipment. None of the furnaces are in need of immediate business and therefore are not disposed to push sales. Therefore while the market on foundry iron nominally rules at $46 to $47 furnace base, it cannot be stated positively what an attractive tonnage might induce. Resale lots of iron continue to be offered at varying concessions under the nominal market, but even these are not attracting much attention. Some producers still report that their customers are taking all the iron they are making subject to some occasional interruption by car shortage. However other producers are not able to move their full tonnage as freely as they have been doing and they are piling some iron. This movement toward the accumulation of stocks appears to be growing. Operations of a number of foundries in this and surrounding territory have been adversely affected by the holding up of orders for castings pending the removal of the Ford tractor plant from Dearborn to River Rouge, Mich., now in progress. As a result these plants have shut off or cut down their pig iron shipments. No developments in this territory are shown by the basic market. In standard low phosphorus $56 valley now is obtainable on attractive orders.

Anticipate Lower Levels

Cincinnati, Oct. 25.—The pig iron market is soft but price schedules in this district have not been revised. While market interests generally anticipate a lower level eventually none expects extreme weakness to be reflected for some time. There is practically no buying but the available supply of iron is limited, a number of furnaces having been out of blast for some time with prospects of others going out from time to time in the remainder of the year. Production cost estimates have been made by practically all of the producers and there is a consensus of opinion that iron cannot be produced to sell profitably at less than current quotable prices, with raw materials at their present levels. Southern makers declare iron ready for the market and to be produced in the near future will not be offered below $42, Birmingham, for the base grade, and producers of northern iron are maintaining the price of $46, furnace, for foundry iron.

St. Louis Market Dull

St. Louis, Oct. 26.—Virtually no sales of pig iron are reported. Inquiries are confined to a few scattering tonnages, mainly to fill out material held in yards. Foundries in the district are slowing down, and their failure to book new business has resulted in numerous requests to defer shipments of tonnages under contract. Some efforts to cancel also are noted, but furnaces are not entertaining such proposals favorably. Feelers put out by consumers have been unproductive of concessions. Considerable resale iron is coming into the market, some offered as low as $38 for No. 2 Southern (1.75 to 2.25 silicon). One Southern producer, however, who is not a regular manufacturer of foundry iron, but who is devoting part of his capacity to that material, is offering iron below $42. According to the representative of a leading Bir-

mingham interest, the firm attitude of the furnaces is due largely to the belief that a reduction at this time would not stimulate buying. The leading furnace interest in the district now is producing satisfactorily, its daily output running something over 300 tons. It is making regular deliveries on contract, but still has about 50,000 tons on its books. The recent slump in scrap iron prices has cut down the demand for off grades of pig iron.

Quotations Continue Firm

Birmingham, Ala., Oct. 26.—Pig iron quotations in the South appear firm on a basis of $42 for No. 2 foundry (1.75 to 2.25 silicon). A few spot sales have been made, but the aggregate is not large. Production is off a little, one furnace being out for repairing. Reduction of stocks continues. Not a heavy amount of iron will be offered for 1921 delivery by the largest interest at $38 for No. 2 foundry, the price it has maintained for two years. Other companies see no reason for concessions. Every inquiry so far has been replied to with a quotation of $42. Local consumption is holding up well. Many reports are current of a declining market, but with a considerable tonnage of iron sold ahead, producers see no need at present for making concessions. One of the active companies in this district announces that the small spot business done this month aggregates one-half its make. There have been no cancellations of orders during the week, and a little more willingness by consumers to receive iron on contracts was shown. The tonnage sold by Southern manufacturers for future delivery will warrant steady shipments for some time.

Wire Needs Fall

Inquiries Decrease, Affecting Nails Which Auto Makers Reject

Pittsburgh, Oct. 26.—Inquiries for wire and nails have shown a decline but makers are heavily committed, some of them well into January on galvanized wire and nails, and well into the first quarter on bright wire. It is claimed that cancellations have been negligible as a general thing, although the automobile trade is said to have cancelled good sized lots of nails, some of them which had been contracted for at minimum prices.

South Slow to Buy

Chicago, Oct. 26.—With the exception of decided slowness on the part of southern jobbers to take on further tonnage of wire and nails, while that section of the country is adjusting itself to lower prices for cotton, the situation as to these commodities remains unchanged. Manufacturers are producing at a high rate and are shipping freely, material which might have gone south being absorbed by heavy demand in other sections. The slowness of southern buyers is expected to be only temporary. Jobbers in general are not yet able to accumulate stocks as their shipments move out immediately to retailers who appear to find plenty of demand to absorb everything offered.

Coke Breaks $5 in Week

Spot Furnace Sold at $11 to $12, with Further Decline in Prospect—Heavier Offerings of Coal May Affect Latter Market Similarly

Pittsburgh, Oct. 26.—Making a sensational drop of $5 a ton since one week ago, the market for standard spot furnace coke today is quoted at $11 to $12, Connellsville ovens. Sales of this grade of fuel at this range have been made to furnaces in sufficient volume to establish a market at these figures, but further declines are confidently expected by consumers. Reductions during the past week not only have been of a daily occurrence, but during the past two days they have been almost of an hourly occurrence, with a continuation of a downward tendency mainly in evidence. Sales at the prices named have been made by producers and brokers, while some of this tonnage has been resale coke, shipments of which have been held up by a steelworks interest, one valley steel maker having disposed of a fair lot. All producers, however, are not selling at the range quoted, some of them pointing out that it will be more profitable for themto ship on monthly coal contracts at $6.50 to $7, explaining that coal at this price represents a net manufacturing cost of coke amounting to $12.50 and that they could not go under the latter figure. It is believed, however, that even though some ovens have been blown out in the Connellsville region and production curtailed, it will not check the market from further decline in view of the considerable blast furnace capacity that has been blown out. It is also pointed out that if operators, rather than sell coke, ship freely of coal this will necessarily bring down the price of the latter product. The trend would be expedited in view of the fact that the lake priority order is expected to be canceled in the immediate future, according to advice received here. This might bring a decided break in the coal market. The market for contract coke and for spot foundry coke is dull and unchanged at nominal quotations. According to the *Connellsville Courier* production in the Connellsville region for the week ended Oct. 16 was 213,265 tons as compared with 212,160 tons for the preceding week.

First Half Contracts Active

Boston, Oct. 25.—Despite the fact that foundrymen generally are not rushed with future orders the continued high prices of coke and the uncertainty in the coal market due to the British situation are causing them to become a little more anxious over their fuel supplies. The approximate consumption of foundry coke in New England is 400,000 tons per year, based on the estimated average during the last three years. Of this amount the New England Coal & Coke Co. supplies approximately three-fourths. Most of the balance is furnished by the Providence Gas Co., which started the production of by-product coke in 1919.

More First Half Sales

New York, Oct. 26.—The Seaboard By-Products Coke Co. a few days ago opened its book on by-product foundry coke for first half and already has taken considerable business for this position as well as a little tonnage for the remainder of this year, at $15, Connellsville, equivalent to $19.47, delivered, Newark, N. J. The New England Coal & Coke Co. also has booked some by-product coke business in this district for shipment this year at $19.30, ovens, or $23.92, delivered, Newark. Sales of spot beehive have fallen off as compared with previous weeks, and prices are easier. Spot beehive foundry coke is bringing $16.50 to $17.50, Connellsville, for standard brands, and a little spot furnace coke was sold at $15.50 to $16.50.

Softness Not So Marked in East

Philadelphia, Oct. 26.— Coke does not reflect as low prices in the East as in other districts. For instance, $17.75 is asked for spot standard foundry coke. Some furnace coke is held at $14, but this is badly off grade. Considerable foundry has been sold for the first half at $15.

Spot Furnace Drops

Cleveland, Oct. 26.—Spot furnace coke has dropped sharply in sales closed in this district this week where $14 or more was done last week. A sale of 15 cars was closed Monday at $13 Conellsville. Lower prices have been quoted since.

Trading in East is Light

Cincinnati, Oct. 25.—With prices of coke in this district influenced by the downward movement there appears to be an irregularity of a perplexing nature. The decline in prices has been general, but in face of the slump here and elsewhere a large local distributor on Saturday booked an order for 8000 tons of Connellsville foundry coke for delivery in the East over a period of several weeks begining with an immediate shipment at $18, oven. Offsetting an unofficial report here that Wise county furnace coke is to be had around $13.50 to $14, oven, a moderate tonnage is going forward to St. Louis at $16.50, oven. The available supply of Pocahontas in this market is limited, but prices are not being maintained and quotations are following the general trend. There is little buying either for spot delivery or for future account.

Accumulating Stocks at St. Louis

St. Louis, Oct. 26.—Aside from a further easing in supplies and a lower trend in prices, little change is noted in the coke market. Shipments from eastern points are satisfactory, and for the first time in many months there are signs of accumulations in plant yards. Demands from foundries are less urgent than a few weeks ago. The leading plants seem well supplied for both immediate and future needs. Despite the sharp reduction in prices for first half there is little contracting. Free offerings are made at $15 for 72-hour foundry coke for next year, but consumers believe that they will be able to do much better. Several producers are willing to quote $14 for sizable lots.

Bar Trade Still Waiting

Illinois Steel Co. Yet To Open Books for Future Business—Specifications Less Active—2.35c Base Quoted by Independent on Forging Bars

Chicago, Oct. 26.—In contrast to the ease with which plates and shapes can be placed with mills, soft steel bars continue to be fairly scarce. The Illinois Steel Co. is sold well into next year, possibly with sufficient tonnage on books now to cover bar production through the first quarter. Occasional small lots, where specifications accompany orders, are accepted from regular customers by this interest at the prevailing figure, although books are not open. In fact, this interest has not yet started taking business for fourth quarter specification. The Inland Steel Co. has been rolling soft steel bars on the mill usually devoted to hard bars and thus has been able to catch up somewhat on its commitments for this product. As a result, this producer is able to accept small tonnages for fairly prompt delivery and is quoting 3.63c, Chicago mill, on such business.

In general the Illinois Steel Co. is operating at the same rate that has prevailed for several weeks, 21 blast furnaces out of 29 and ingot production about 85 per cent. The Inland Steel Co. has 100 per cent production of pig iron, and about 60 per cent capacity in ingots.

Business coming to makers of bar iron is somewhat slack and some cancellations have been received. Railroads continue to buy fairly well and are taking their entire tonnage. Demand for this product is slack. Quotations continue at 3.75c to 4.00c, mill. Demand is also slackening for hard steel bars rerolled from rails, but under present conditions of old rail supply and single turn operation of mills, this is not troublesome. Mills continue asking 3.75c to 4.00c, mill.

Little Business Is Going

New York, Oct. 25.—Deliveries on bar iron have improved, it now being easy to obtain material for almost immediate shipment from any mill in the East. Some mills have suspended operations and others have curtailed, with the result that production on an average is scarcely 50 per cent of capacity. While many sellers continue to quote 4.50c, Pittsburgh, there is little if any business being booked at this figure; in fact, there appears to be little going at any price. Some sellers are quite frank to admit that a consumer should have no trouble closing on a sizable tonnage at 4.25c, and possibly less. It is asserted that 4.25c, Pittsburgh, has been done.

Market Not Tested

Philadelphia, Oct. 26.—Eastern independents generally continue to ask 3.25c base, Pittsburgh, for steel bars, with no shading of this figure. However, no attractive tonnages are offered, so that the market is not tested. Reinforced bars for nearby shipment are easy to get at 3.25c, Pittsburgh.

Sales At 3.00c Reported

Pittsburgh, Oct. 26.—Sales of merchant steel bars at 3.00c, base, Pittsburgh, are reported to have been made. One mill which opened its books about a week ago at the Carnegie Steel Co. price of 2.35c base, Pittsburgh, for some of its regular customers is understood to have withdrawn this figure after booking a round tonnage. It is claimed that this interest had had rather heavy cancellations and in order to recover its bookings named the low level, but after taking a sizable lot on this basis withdrew the figure and now is quoting a higher level. Most independents still are quoting 3.25c, base, but state that the market is extremely dull and that practically no new business has been done during the past week. Cancellations are said to have been light.

Meets Low Price of 2.35c

Cleveland, Oct. 26.—Sharp competition in this territory has developed a quotation this week by an independent mill down to 2.35c base Pittsburgh, the basis being named by Steel corporation plants. This base quotation was made on a lot of forging bars with the usual differential added. It is attributed to an interest in the Pittsburgh district.

Market Is Dull

Pittsburgh, Oct. 26.—The market for cold-finished steel bars has become dull and makers generally are more anxious to take new business in view of the rather heavy cancellations and suspensions coming to them from the automobile trade. It is claimed that these cancellations practically are at an end and that with the quotation of 3.00c on merchant steel bars being quoted to them, makers of cold-finished steel bars are in a better position to seek new business. The price range on cold-finished steel bars still is being maintained at 4.10c to 4.25c but it is claimed that attractive specifications might bring about a lower level than the maximum now named. Operations are estimated at about 65 per cent of capacity and deliveries are being made in 30 to 60 days, the longer period being required for the smaller sizes. One deterring influence in the market is the fact that a number of automobile interests are selling good sized lots of cold-finished steel bars at less than the market quotations.

Bolt Demand Slackens

Chicago, Oct. 26.—Although inquiry for bolts and nuts is less insistent than in recent weeks, sufficient business is offered to makers to keep them in comfortable position. As much business is being taken on as they desire, and as no cancellations are appearing, they have considerable quantities still on their books. New business is coming in practically equal to shipments. No change has been made in prices which are generally at the level prevailing for several months past.

Cancellations Are Light

Pittsburgh, Oct. 26.—Makers of nuts, bolts and rivets report that cancellations are light and that none has been made by the railroads which are placing orders for fair sized lots of bolts and nuts. Most producers are committed for the remainder of the year and some of them are sold well into the first quarter of 1921.

Only Resale Offers

Ferromanganese Demand Lacking and Market is Inactive—Spiegel Lower

New York, Oct. 26.—Demand for ferromanganese continues lacking, and the only market activity is in the form of low offers at resale. Second hands continue to offer ferromanganese for prompt and nearby shipment at around $150, but it is not unlikely that second hand material could be had at less, in view of the fact that several carloads have been sold at resale of late at as low as $135, delivered. The producers and importers continue to ask $170, c.i.f. tidewater, but in view of the lack of business, this price is entirely nominal. While some of the English ferromanganese makers have banked their furnaces because of the coal strike, at least one English interest continues to produce and has enough fuel on hand to maintain its output for four or five weeks.

The spiegeleisen market price has been cut in a transaction involving a large tonnage for fourth quarter, but special considerations figured in the deal. However, the market now is lower and may be quoted at $80, furnace, for 19 to 21 per cent, and $77.50, furnace, for 16 to 18 per cent.

Prices of the special ferroalloys and alloy ores remain about unchanged in an inactive market. One or two of the smaller alloy steelmakers west of Pittsburgh have been figuring on their 1921 requirements, but nothing important is reported closed. It now is believed that the big users of ferrochrome who usually contract in November for the next year may delay until December this year. Ferrochrome quotations are about unchanged at 16.50 to 17 cents, for spot foreign alloy containing 6 to 8 per cent carbon and with domestic makers quoting 18 to 19 cents a pound contained. A sale of 50 per cent ferrosilicon is reported at $78, furnace, and this alloy continues quoted $80 to $85, delivered. Practically no business is reported going in ferrotungsten. Spot foreign alloy is quoted 75 cents, exstore, New York, while lower prices could be done for importation. Domestic makers are asking up to 90 cents a pound contained. Some makers of high grade ferrovanadium running under 3 per cent in silicon still are quoting $8.25 a pound contained, while low grade alloy is quoted $6.50, base. It is understood the recent inquiry for 40 tons of high grade has not yet been closed.

Tungsten ore continues quoted about $4.25 a short ton unit for high grade Chinese concentrates. Chrome ore prices are steady, 80 cents a unit being asked for New Caledonian and 75 cents for Indian chrome.

No Business Moving

Pittsburgh, Oct. 26.—Practically no new business for ferroalloys is moving, the market being extremely dull and without any sizable inquiries. The

quotation of $170, tidewater, still is being named by some sellers on 80 per cent ferromanganese but this can be shaded as is shown by the fact middle interests are offering to sell this alloy at as low as $150, delivered. Even this does not appear to have attracted any buying. So far the strike of British coal miners has not had any effect on the market. Spiegeleisen also is weak and tonnages are being offered by some sellers at as low as $70 for the 18 to 22 per cent grade.

Demand Practically Absent

Chicago, Oct. 26.—Ferromanganese is nominally quoted at $170, seaboard, but in the absence of trading, no insight into the real condition is possible. No inquiry is being made, and sales are practically absent. A Chicago steel producer recently closed for 500 tons of bessemer ferrosilicon, but the price is not known. Spiegeleisen is a drug on the market, and shows no activity.

Warehouse Prices

Divide Market in Chicago—Are on Decline in Boston

Chicago, Oct. 25.—By the action of one independent steel warehouse last week in reducing its prices on plates, shapes and bars to the level of Steel corporation stores, the warehouse market now is about evenly divided in Chicago, with two independents quoting about $10 per ton higher on these products than the other three. The higher schedule seems likely to be maintained for some time under present conditions, as these stores have larger assortments.

Warehouse Grades Decline

Boston, Oct. 25.—Warehouse prices are on the decline in Boston. One independent house has made a reduction of ½ a cent per pound upon practically all grades and other houses at present are considering meeting these new prices. Already in one or two cases individual reductions on certain grades have been made so that the present situation is a hard one to represent with quotations.

Some Material Is Scarce

New York, Oct. 25.—Marked scarcity of cold-drawn flats is an outstanding feature in the local warehouse market, with the result that demand for this material is most urgent. There is also a good demand for other cold-drawn materials. These, however, are in better supply, and consequently, are not so eagerly sought. Galvanized sheets and steel bars are moving in fairly good volume, with shapes and plates sluggish. Prices are unchanged.

Fair Demand Is Current

Cleveland, Oct. 26.—Although sluggish, demand for warehouse stocks is coming out in large enough volume in this district to keep jobbers fairly busy. Inquiries from manufacturers which had been noted a week ago, were not so prevalent this week, and this indicates the erratic condition of the market. Jobbers state that mill buyers are to some extent filling their needs with warehouse stocks, buying in small lots, and thus holding off with their purchases from mills.

Plate Prices Are Lower

Independent Mill Prices of 2.90c Made at New York and Even 2.65c Appears in Cleveland District—Some Sales at 3.00c

New York, Oct. 25.—Independent mills have quoted 2.90c, base, Pittsburgh, on some important plate business now being offered in this market. This includes 3000 to 4000 tons of sheared tank plates for the Standard Oil Co. of New Jersey, and 1300 to 1500 tons for the American Locomotive Co. Of the requirements of the latter interest, half are sheared tank plates and half boiler and firebox plates, and this steel is to be used for building locomotives recently booked from France. It is expected both tonnages will be placed at less than 3.00c, base, in the next day or two. With the exception of these inquiries, the plate market here is quiet and featureless.

The Standard Shipbuilding Co. is inquiring for 8000 to 9000 tons of ship plates in connection with vessels upon which it now is figuring. These plates are for shipments of 1000 tons monthly commencing in December.

Offerings at 3.00c in East

Philadelphia, Oct. 26.—Plates now are easily obtainable from independent mills for early shipment at 3.00c, base, Pittsburgh. Some business was done in the past week on this basis, but consumers generally are not buying tonnages of any size in this district. In some cases where independents quoted 3.00c on sheared tank plates they were told they were too high, and it was rumored that some independents intimated a willingness to do less. A round tonnage of steel skelp was sold at 3.00c, Pittsburgh.

Maintaining Level of 3.25c

Pittsburgh, Oct. 26.—Prominent makers of steel plates still are quoting a price of 3.25c, base, Pittsburgh, and one sale involving 1200 tons at this figure has been made by an independent interest in this district, the tonnage being for tank construction. The market is extremely dull and it has become difficult to define it clearly as to price because of the dearth of new business. So far as reported here, no new business has been taken by two western interests at the figures of 2.65c and 2.75c, base, Pittsburgh, which they are said to be quoting, or by a Middle West maker who is said to have offered to take business at $1 a ton less than other independents. The figure of 2.65c, base, is the same as that maintained by the Carnegie Steel Co.

Quote Corporation Price

Cleveland, Oct. 26.—The first quotations on plates by independent mills on the same basis as the Steel corporation as 2.65c, Pittsburgh, have appeared in this territory. This has been in connection with some plate fabrication work now up for figures. Little new business in plates is offered. In prospect are 600 tons for vaults for federal reserve banks at Chicago and in the South.

Tank Plates Sold at 3.00c

Youngstown, O., Oct. 26.—Orders for plates continue scarce and while makers are quoting 3.25c, mill, it is thought this figure might be shaded on a substantial tonnage. In fact, a sale of 900 tons of tank plates was made by a maker here last week at 3.00c, mill, for early delivery. Outside of this order little business has been booked recently and it is said that a price lower than 3.25c now must be quoted if new business is to be obtained.

Demand Is Light

Chicago, Oct. 26.—While the Illinois Steel Co. is booked ahead on steel plates sufficient to continue operations into next year, it is believed an attractive tonnage fitting into the rolling schedule might be placed for delivery this year if it were not too large. The Inland Steel Co. is able to give fairly prompt delivery on plates, although its 90-inch plate mill is being rebuilt to roll plates 100 inches wide, and production is being held up until it is ready to operate again, which will be early in November. The latter producer is quoting 3.63c, Chicago mill on plates.

Meeting Dates Advanced

Meeting dates for the fall gatherings of the National Tool Builders' association and the National Supply & Machinery Dealers' association at the Hotel Astor, New York, have been set forward from Dec. 2 and 3 to Nov. 11 and 12. Conditions prevailing in the machine tool equipment and supply industry are said to be back of the calls for earlier meetings. Charles E. Hildreth, Worcester, Mass., is general manager of the former and Thomas A. Fernley, Philadelphia, is secretary-treasurer of the latter organization.

Rushing Ore Shipments

Duluth, Oct. 26.—Mining operations on the Minnesota ranges are being rushed in an effort to move as large a tonnage of ore as possible to the docks before the close of season. Labor conditions at the mines are satisfactory, and it is predicted that the tonnage shipped during October will equal the record of two years ago, when it was 8,341,593. The Oliver Iron Mining Co. will ship its full season schedule, and some independents are increasing their tonnages. Six cargoes were loaded at Allouez docks, Superior, today, and 30 more boats are scheduled to load at once.

Brazilian Ore Offered

Philadelphia, Oct. 26.—Manganese ore was sold this week at prices establishing the market at 55 cents per unit, tidewater, for Indian, and 50 cents for Brazilian. Some Indian ore, already loaded, was sold at 53 to 55 cents, cargo spot. Brazilian ore now in New York is offered at 45 cents.

Scrap Continues Lower

Downward Movement Is Not General But Various Grades in Several Districts Are Marked Off—A Few Grades Up

FOR COMPLETE SCRAP PRICES SEE PAGE 1236

Chicago, Oct. 26.—As an interlude to the long decline in iron and steel scrap, quotations have been advanced on a few grades for which demand has come out, while at the same time declines have been registered in other grades which continue to be neglected by buyers. Several producers of bar iron have recently been in the market for busheling scrap and have purchased several thousand tons in the aggregate, with the result the price has been advanced. A scarcity of No. 1 busheling developed under this demand, as dealers have been using busheling scrap as shoveling steel while demand for it as busheling has been absent. This buying movement probably will not continue. Rerolling rails have been coming out from railroads in better tonnage than through recent weeks, most being absorbed by dealers to apply on contracts, but a few sales of spot material have been made to consumers at $34. The increase in output from railroads is not sufficient to relieve the scarcity which has existed for some time. Railroad offerings at the moment are fairly light. The Santa Fe railroad offers a list containing 2050 tons.

Export Demand Halted

Boston, Oct. 25.—The suddenness with which steel mills closed down on scrap buying is taken by some dealers as an indication that the present slump may be an artificial one and that buying will be resumed in the near future. In New England the market for all grades of scrap iron and steel is inactive. No. 1 machinery is being held up to fairly firm prices largely by concerted action of the dealers who refuse to let tonnage go at any appreciable concessions. One sale made during the week was for $42 but the bulk of the tonnage reported has been sold to consumers at from $40 to $41. The export demand for heavy melting steel which for sometime has made it possible for local dealers to sell this grade at $2 or $3 above the normal market has now at least temporarily been held up because of the situation in England. The last ship to sail loaded with some 7000 tons of scrap is tied up at an English port unable to unload and further sailings have been canceled. A few scattering orders for heavy melting steel are reaching this market from Pittsburgh and to cover these dealers are paying about $20 in Boston. Other than this the price for heavy melting is not over $19. Borings have been in slightly renewed demand and $16.50 has been paid by the larger dealers.

Prices Slump Off

New York, Oct. 26.—Weakening in some description is again in evidence the scrap. Heavy melting steel after remaining steady for a couple of weeks, has again declined, this time to $18 to $19, f.o.b. New York. Cast iron car wheels, steel car axles and No. 1 heavy cast have also slumped off $1. Shafting has fallen off 50 cents. With consumers still filling their needs from shipments on back orders, new business in the local market remains negligible. Dealers, consequently, are doing little buying, with the result present prices are largely nominal. It is believed, though, quotations on most materials could be shaded by a thrifty buyer.

Trading in East Is Light

Philadelphia, Oct. 26.—Business in the scrap market is in small volume, and the price trend is lower. A moderate tonnage of steel was bought by an eastern Pennsylvania mill at $23, delivered, and some business is reported to have been done at $22. Small sales of railroad wrought at $27, forge and bundled sheets at $17, plate at $26, and cupola cast at $38 also are reported.

Market Is Easier

Pittsburgh, Oct. 26.—The market for iron and steel scrap is listless with virtually no inquiries coming out and while quotations are largely nominal the market really shows a decline of from $1 to $2 on most grades. The easier tone of the market is reflected in the fact that the lower quotations are those which dealers would apply against contract business. In the event they attempted to force sales at these prices, it is likely they would be unsuccessful and might have to make concessions. At the same time it is not unlikely that if consumers came into the market for good sized tonnages they might have to pay higher prices than those named. It is said one large consumer of heavy melting steel is about to come into the market for a good sized tonnage and should this eventuate it is expected it would result in giving a clearer definition of the position of the market. A sale of 500 tons of iron axles at $52.50 is noted.

Heavy Melting Down

Buffalo, Oct. 26.—Heavy melting steel has been among the scrap materials to feel the influence of a sagging market and is now quoted at $24 to $25. Other grades have also weakened considerably. With the lower prices dealers who have old orders are endeavoring to clean these up. Mills demand strictly specification shipments on these old orders.

Two Grades are Lower

Cleveland, Oct. 26.—Trading in iron and steel scrap continues to be confined to dealers and is of comparatively light tonnage. Permits are the chief obstacles to the free movement of material, much of which remains to be shipped on contract. With two exceptions prices remain unchanged as compared with last week's quotations. Heavy cast which for some time has been $31 to $31.50 is down to $29 to $29.50 while old steel rails for rerolling are off $3 a ton, now being quoted $33 to $34.

Tendency Still Downward

Cincinnati, Oct. 25.—Prices at the recent declines in iron and steel scrap market have been maintained, but the market is easy and the general tendency plainly is toward a lower level. Buying is at low ebb and there are perhaps fewer inquiries looking to future buying in the market today than for many months past.

St. Louis Prices Again Decline

St. Louis, Oct. 26.—Scrap iron and steel prices have been reduced again 50 cents to $3 a ton. Consumers are not buying, and the same is true of dealers, save those who are covering on short sales. Those having to deliver material on previous sales are able to acquire it on advantageous terms, except in a few instances where immediate delivery is wanted. In the latter case some dealers are paying small premiums. Yard interests are not laying on a pound, unless it can be bought at unusually low figures. Meantime the railroads continue to offer material, and pressure from that source is accelerating the drop. The Pennsylvania lines, West, sold 2000 tons on Oct. 22, the prices realized being among the lowest paid in many weeks. On Oct. 25 the St. Louis & San Francisco railroad will dispose of 2400 tons, including 1000 tons of mixed railroad scrap. The Missouri Pacific is selling 10 carloads. It is extremely difficult to interest even the regular dealers in railroad sales, and bids are unsatisfactory. Rerollers now are $31 to $31.50, which compares with $40, obtained about the middle of August. Slowing down in foundry operations is reflected in the dullness of cast and malleable. No. 1 wrought has declined $3, and No. 2 wrought cannot be sold. There is no demand for locomotive tires and machine shop turnings are quoted at $9.

Southern Market Lifeless

Birmingham, Ala., Oct. 26.—Nothing of importance is transpiring in the scrap market in the South. Nearly all deliveries on old contracts have been made. Price lists are nominal, as consumers are not willing to purchase. Heavy melting steel is offered at $18, and price readjustments are made almost weekly. Stocks on hand are of fair proportions.

Ore Situation

Improves As Season Nears Close—Less Demand Felt

Cleveland, Oct. 26.—Shipments of iron ore from the Lake Superior district for the present season up to and including Oct. 21 amounted to 50,173,000 tons. Current shipments indicate that he figure will be brought up to 52,953,000 by Nov. 1, and if favorable weather conditions continue to prevail the season's total may be approximately 58,000,000 tons. This anticipates a shipment of about 5,000,000 tons in November and he remainder of the season, as compared with approximately 8,680,000 in October. Unusually good weather conditions have facilitated transportation

of ore and shippers are in a much better situation than they anticipated a monh ago.

At the same time, prospective slackening of furnace operations have dissipated the fears which several of the leading operators expressed regarding the possibilities of their being able to make adequate deliveries. Contracts will not be filled, but demand is less urgent. While two leading furnace interests in the East had but few weeks supply of ore on hand a month ago and then were seriously concerned, especially in regard to the lack of cars to haul ore from the open pit mines in Minnesota to the docks, general improvement in shipping facilities, coupled with the present outlook in the pig iron market, is responsible for a more reassuring attitude.

The leading operators report requests for cancellations or carry-overs negligible; nearly all buyers being willing to take all the ore they can get. One of the largest producers reports several smaller furnace interests have asked it hold up shipments to an aggregate amount of 50,000 tons; another reports a request for a carry over of 3000 tons, and a request for the cancellation of 100,000 tons, which cannot be complied with. These figures substantially represent the aggregate tonnage affected. A shipper who attended the meeting of the American Iron and Steel institute reports having received inquiries for 50,000 tons; while another has an inquiry for 15,000 tons, these representing "fill-in" lots.

The M. A. Hanna Co., Shenango Furnace Co., and the Oliver Iron Mining Co., have appealed to the Minnesota tax commission from the action of the local taxation officials of Chisholm, Minn., in raising their combined assessments $7,000,000. Hearings were held last week, decision to be announced later.

Report Strip Shading

Pittsburgh, Oct. 26.—Reports are persistent that makers of hot and cold-rolled strip steel are making concessions and that sales have been made at 50 cents a 100 pounds under the general quotation of 5.50c on hot rolled and of 8.50c on cold-rolled strip steel. Some producers insist that they still are maintaining these higher levels but report that business is extremely dull and that cancellations by the automobile trade have been heavy. Operations have been affected by cancellations and suspensions and now are estimated at about 65 per cent of capacity.

Resale Offers Increasing

Philadelphia, Oct. 26, (by wire).—Resale offerings of plates, shapes, bars, sheets and billets are increasing, especially these made by western agricultural implemnt makers who are reported desirous of reselling large tonnages in some instances below the Steel corporation's prices. It is reported that a Pittsburgh consumer has bought a large tonnage of rerolling billets at resale for $45, Pittsburgh. Considerable material originally ordered for Cuba and now held up by the moratorium in that country, also is offered for resale.

Seek New Sheet Business

Mills Canvass Trade but Attractive Prices Fail To Bring Out Consumers —Prices Soften—More Automobile Makers Suspend Tonnages

Youngstown, O., Oct. 26.—Sheet producers generally are canvassing the trade closely in an effort to line up new business. Most of the sheet tonnages awarded recently have come from western consumers. The trade generally is withholding orders and although several mills have issued lists of various grades of sheets in stock gages and sizes at attractive prices, their offerings have failed to stimulate buying. Consumers generally are drawing on their stock of sheets and many state that until market conditions become more clearly defined, their policy will be to purchase conservatively. Mills in some cases have lowered production to conform to the amount of business in hand. One maker in the upper part of the valley did not start its mills this week on account of the lack of coal.

Many sheetmakers here continue to quote between the range of 5.00c and 5.50c for blue annealed, 6.50c to 7.00c for black and 8.25c to 8.50c for galvanized, base gages. However, sales of blue annealed by certain mills here and in a nearby district are heard between 4.50c and 5.00c, black between 6.00c and 6.50c and galvanized between 7.75c and 8.25c. In fact one mill last week booked 1800 tons of 18 gage, one-pass black at 5.75c, mill from a consumer in the Middle West.

Additional curtailment in the production of pleasure cars is reflected by the action of certain automobile interests in requesting mills here last week to hold up their shipments of steel. One of these interests, a subsidiary of a large corporation in the Detroit district, issued instructions to suspend delivery temporarily of bars, sheets and 1400 tons of strip steel. Another interest, a maker of low-price cars, notified mills to ship only a certain amount of tonnage as its future plan is to maintain only enough stock to keep its plant in operation 25 days as against a few months run normally.

Little Business Done in East

Philadelphia, Oct. 26.—The sheet market continues soft and new business offering is very small. Blue annealed sheets continue at 5.00c to 5.50c, Pittsburgh, but it is unnecessary to pay more than 5.25c for attractive tonnages. Black sheets now are held 6.25c to 6.50c.

Cancellations Have Been Heavy

Pittsburgh, Oct. 26.—Cancellations by the automobile trade of contracts for sheets have been heavy. Producers who have been making this class of tonnage have found their bookings greatly lightened and they are more urgently seeking other business. It is said that other cancellations have been comparatively light. Those that have been made have left the market weaker and lower prices are being quoted. It now appears that the maximum price for No. 28 black sheets is 7.00c, with reliable reports that sales have been made at 6.50c, while the range on No. 28 galvanized sheets is said to be 7.75c 8.25c, sales having been made at the former price, with transactions in No. 10 blue annealed sheets at 4.90c to 5.25c. Cancellations have resulted in lessened output of sheet mills with the industry operating at about 80 per cent of capacity. Some producers have bookings which will carry them into 1921 in the absence of further cancellations or suspensions.

Chicago Situation Easier

Chicago, Oct. 26.—While producers of steel sheets in the Chicago district have nothing to offer for this year, and both will carry unfilled tonnage into 1921, the situation is decidedly easier as independent mills in the East are seeking business at somewhat reduced quotations. As nearly as can be learned, No. 10 gage blue annealed can be obtained now at 5.25c to 5.50c, Pittsburgh, No. 28 gage black at 6.50c to 7.00c, Pittsburgh, and No. 28 gage galvanized at 8.00c to 8.50c, Pittsburgh. Some requests for cancellations have been received by local producers, but inasmuch as the business was taken on under protest several months ago, the requests are being refused. The Inland Steel Co. has not yet begun to dispose of its remaining first quarter tonnage, and has not decided its policy in this respect.

Price At $7

May Be Kept By Leading Tin Plate Producer—Bookings Late

Pittsburgh, Oct. 26.—Considerable interest is being shown as to the price that independent makers of tin plate will quote on first half business now that it is understood but not verified that the American Sheet & Tin Plate Co. will maintain its level of $7. The independents will wait until this interest formerly opens its books about Dec. 15. The opening by the leading producer will be about one month late this year. It is believed the independent price will be well under $8, if not actually on a level with that of the American Sheet & Tin Plate Co., which is booked well into first quarter. Some independents also are committed into next year. The latter are selling stock items at $8.50 when in car lots and at $9 in less than car lots. Demand has become easier. Operations are estimated at 80 per cent of capacity, although some producers are operating at 90 per cent.

The Laconia Car Co., Laconia, N. H., has issued $700,000 3-year 8 per cent serial notes to provide working capital to take care of its increasing business. Unfilled orders amount, at the present time, to $1,800,000, or sufficient to keep the plants busy for eight months. W. H. Raye and P. W. Brown have been added to the board of directors of the company.

Shape Business Is Light

Small Jobs Are Rule in All Territories—Plain Material Sales at 3.10c but Lower Is Reported on Desirable Work

New York, Oct. 25.—Orders and new inquiries in the local structural market during the past week have all been well under 1000 tons. In fact, the largest order reported aggregated 400 tons and the largest inquiry, 600 tons. Owing to the continued lull, deliveries at the mills are improving steadily, and curtailment in production is reported in some quarters. At one or two of the mills, however, a shortage of cars has deferred shipments. Prices are unchanged at 2.90c to 3.10c, Pittsburgh. Irregularities in building operations brought by hearings before the Lockwood legislative committee undoubtedly will defer much new construction in this city until the investigation has been completed. Contracts on the proposed $20,000,000 court house here have been revoked, which involved several thousand tons of steel.

Little Demand in East

Philadelphia, Oct. 26.—Shape demand is almost entirely lacking in the East. The market is on a basis of 3.00c, Pittsburgh. The Belmont Iron Works has taken 400 tons for a plant for the Illinois Glass Co., at Bridgeton, N. J.

Sales Made At 3.10c

Pittsburgh, Oct. 26.—That the level of 3.10c, base, Pittsburgh, for structural shapes has not disappeared is made evident by the fact that two important independent producers report sales at this figure, one of them involving 300 tons and another 400 tons. It is claimed, however, that this figure has been shaded but it is still considered to be representative of the going price of some important makers. Fabricators report that the market is extremely dull. Complaint has been made of the shortage of open-top equipment during the past week and one fabricator now has a greater tonnage piled at its plant than at any time during the current year, both because of the lack of cars and the labor situation.

Federal Bank Still Pending

Chicago, Oct. 26.—Most interest in the structural market is centered on the award of steel for the Federal Reserve bank building, which seems likely to be made within a short time. Several general contractors who have submitted bids were in Washington last week consulting with the federal reserve board relative to their figures. Several small lots were awarded during the past week with no tonnage of notable size. The Inland Steel Co. continues to quote 3.48c, mill, for structurals, but in the absence of new business its heavy structural mill is idle.

CONTRACTS AWARDED

Bridge work for the Central Railroad of New Jersey, 400 tons, to Phoenix Bridge Works.

Power plant for Cheswick Power Co., Springdale, Pa., 250 tons, to Riter-Conley Co.

Factory for Barbara Asphalt Co., Perth Amboy, N. J., 250 tons, to Levering & Garrigues.

Five crane bridges for Niles-Bement-Pond Co., New York City, 400 tons, to American Bridge Co.

Machine shop at Turner's Falls, Mass., for Montague Machine Co., 200 tons to the McClintic-Marshall Co.

Foundry extension at Barberton, O., for the Pittsburgh Valve & Fittings Co., 150 tons to the McClintic-Marshall Co.

Plant for Illinois Glass Co. at Bridgeton, N. J., 400 tons, to Belmont Iron Works.

CONTRACTS PENDING

Pier for Standard Oil Co., Bayonne, N. J., 600 tons, bids asked.

Outlook Is Promising

New York, Oct. 25.—Prices on concrete bars for shipment at mills' convenience, which includes prompt and nearby shipment, now range from 3.25 to 3.50c, base, Pittsburgh. While there is not a great deal of business offered in the concrete bar market at present, there are indications that a lot of work will be coming out in this district shortly for next spring. The most important job now pending includes 350 tons of bars for a building at East Orange, N. J. The National Steel Rolling Co., Schuylkill Haven, Pa., has taken a contract whereby it will supply all the requirements of the Republic Fireproofing Co., 26 Cortlandt street, New York, for the next six months, and it also has contracted to roll 1200 tons of Havemeyer sections for the Concrete Steel Co., New York.

CONTRACTS PENDING

Building for Ward Baking Co., East Orange, N. J., 350 tons.

Strong Market

Still Rules in Tubular Products—Columbus Rejects Pipe Bids

Pittsburgh, Oct. 26.—Of all the iron and steel products, the market for pipe easily is the strongest and does not show any change whatever, being firm at the discounts quoted by makers of both iron and steel buttweld and lapweld grades. Demand still is heavy and is greatly in excess of capacity, and producers are considerably behind in their schedules. While operations are being maintained at a good rate, it is likely that some plants will have to curtail output soon unless they get a better supply of cars.

Reject Columbus Bids

New York, Oct. 25.—All bids on the 4400 tons of cast iron pipe for Columbus, O., have been rejected, and new bids will be advertised for after the first of the year. Trading in the East continues in relatively small proportions, and the situation as a whole is featureless.

Slow to Close Inquiries

Chicago, Oct. 26.—With inquiry for cast iron pipe exceedingly scarce, sales are even more so, as cities opening bids are slow to award the tonnage. As an exception to this rule, Gothenburg, Nebr., has awarded about 100 tons to the National Cast Iron Pipe Co. Bids were rejected on 250 tons for which bids were opened Oct. 19 at Ecorse, Mich. No award has been made on 1250 tons for which bids were opened Oct. 16 by officials of Montgomery county, at Dayton. An inquiry is current in this market for 2 miles of 8-inch pipe totaling about 300 tons, which is desired by a western railroad.

Prices Firm in South

Birmingham, Ala., Oct. 26.—While the cast iron pipe market still is rather slow, prices are being maintained. One of the leading producers in this district states: "We look for no change in prices this fall, but much depends on pig iron prices. For the remainder of this year and to a large extent through the first quarter of next year, blast furnaces claim to have their capacity well booked. If this is correct, it means that pig iron prices for several months to come probably will remain strong." Shipments of cast iron pipe on old contracts are being made steadily. New business is light.

Rail Tonnage

Placed by the Reading—Various Prices Considered by Mills

Philadelphia, Oct. 26.—The Philadelphia & Reading railroad has placed 15,000 tons of rails with the Bethlehem Steel Co., for delivery in 1921. The price is to be fixed later. The Pennsylvania railroad is inquiring for 100,000 tons. Other roads are showing interest, including the Chesapeake & Ohio, Baltimore & Ohio, and the Norfolk & Western. While the independents have not yet fixed prices for 1921, it is understood that one mill regards $62.50 as fair and it is intimated that another may quote $59 while another is talking of $65 to $70.

Orders For Cars Placed

New York, Oct. 26.—Orders for 700 composite freight cars have been awarded by the Western Pacific Railroad Co. and 50 hoppers by the Richmond, Fredericksburg & Potomac railroad to the Pressed Steel Car Co. Arnold Bros., New York City, are inquiring for 1000 gondolas for export. Other inquiries aggregate possibly 600. The Southern railroad is inquiring for 50 locomotives.

Inquiry Is Light

Pittsburgh, Oct. 26.—Inquiry for standard railroad spikes is light, the only sizable one that has developed in this district during the past week having been put out by the Atchison, Topeka & Santa Fe railroad which is asking for 15,000 kegs of 6 x 9/16-inch spikes for prompt delivery. The market on standard spikes is quoted at 4.00c to 4.25c. Deliveries are being made in about 60 days. There has been a let-up in the demand for small spikes, although it still is fair, and jobbers are replenishing their stocks. Deliveries on these sizes are being made in about three months. One interest is quoting 5.00c on ½-inch, 7/16-inch and ⅜-inch sizes, and 5.75c on the 5/16-inch size, while a price of 5.00c, base, is quoted on boat spikes. The range of 3.25c to 3.75c still is being named on light rails, 25 to 45 pounds, although it is said that

an attractive specification might develop a figure of 3.00c. An independent interest reports a sale of 500 tons of the lighter sections from stock at 3.50c and of 950 tons of the heavier sections, 25 to 45-pound rails, at 3.75c. These figures are being obtained where deliveries are to be made promptly.

Rail Tonnage Nearly Closed

Chicago, Oct. 26.—Practically nothing remains to be done relative to standard steel rails from the Chicago mill for 1921 delivery except to obtain signatures to contracts which have been under negotiation for some time. This matter is well advanced and practically all roads normally drawing their supply from this source are covered, and at the same time the Chicago mill has disposed of practically its entire tonnage for the coming year. An eastern rail mill recently sold a small tonnage into Chicago territory at $62.50, mill. Inquiry for railroad cars has ceased, nothing new coming out for the past fortnight, and no contracts have been made on inquiries previously received.

Made Institute Director

George F. Downs, president of the Lackawanna Steel Co., has been elected to the board of directors of the American Iron and Steel institute, to fill the vacancy caused by the death of C. H. McCullough, former president of the Lackawanna company.

Resales Cut Semifinished

Additional Offerings Weaken Market—Independent Producer Reduces Rerolling Steel to $55—Less than $55 Done on Resale Sheet Bars

Pittsburgh, Oct. 26.—Offerings of good sized lots of semifinished material at prices considerably below those named by producers has further weakened this market, and responding to this one prominent independent producer of billets has reduced its quotations from $60 to $55, Pittsburgh, on soft 4 x 4 rerolling steel. Some producers still are quoting $60 but concede they are not getting any new business at this level. Makers, generally, still quote $65 on sheet bars, but it seems apparent this level would be shaded at least $5 and perhaps more on an attractive specification. It is reported resale tonnages are being offered at less than $55 and are of standard quality. Some of this was intended for export. With the curtailment of operations of steel mills, consumption of sheet bars has decreased and most consumers appear to be well covered, although it is said one important interest may come into the market soon for a large tonnage. The market for forging billets also is dull and easier, and the price range now appears to be $65 to $70, Pittsburgh, the former figure being more representative of the market than the latter. No business has developed for wire rods and one producer has curtailed production. Skelp continues quiet and is quoted at 3.25c, Pittsburgh, for domestic business. Slabs are quoted at $55 to $60, Pittsburgh.

Rerollers Sold at $55

Philadelphia, Oct. 26.—The only business reported in semifinished material this week is the sale of one lot of about 500 tons of rerolling billets at $55, Pittsburgh. This indicates the market on standard open-hearth materials. Some so-called boneyard steel, comprising off quality, is available at lower prices. The last price done on forging billets was $65, Pittsburgh.

Shipments Being Held Up Again

Youngstown, O., Oct. 26.—Quietness in the plate market continues to hold the sale of slabs in this territory to a minimum. Little inquiry for this grade of semifinished material is coming out and for this reason quotations are lacking. The market here, however, is $60. Billets, 4 x 4 inches and larger, also are quotable at $60, Youngstown, the price of the smaller sizes ranging from $60 to $65, Youngstown. Forging billets are offered at $65 by one mill and $70 by another.

Sheet bar consumers are not specifying against contracts as heavily as they were recently. Practically no new business for this commodity is coming out. The market here is quotable between $62.50 and $65. A sale of a few hundred tons of open-hearth sheet bars was made last week at $55, Pittsburgh, for immediate delivery to a western Pennsylvania consumer.

Shipments of bars, shapes and semifinished material from mills here are beginning to be held up again on acrount of the lack of carriers. One steelmaker now has approximately 18,000 tons of these products piled as compared with a few hundred tons two weeks ago.

The Nonferrous Metals

	‡Copper	Future Straits N. Y.	†Lead New York basis	Zinc St. Louis basis	Aluminum	Spot antimony	Nickel ingot
Oct. 20	16.00	41.00	7.25	7.15	33.00	6.50	43.00
Oct. 21	16.00	41.00	7.25	7.15	33.00	6.50	43.00
Oct. 22	15.50	39.75	7.25	7.10	33.00	6.50	43.00
Oct. 25	15.00	40.50	7.25	7.05	33.00	6.45	43.00
Oct. 26	15.00	41.50	7.25	7.10	33.00	6.45	43.00

*Future shipment from Singapore or London.
†Import, price, duty paid.
‡Producers, price delivered, prompt and October; outside 16c to 16.12½c.

NEW YORK, Oct. 26.—Copper again occupied the center of the stage in the metal markets the past week, prices declining about 1½c further. The total drop the past month has amounted to nearly 4c a pound, the quotation for electrolytic copper by the leading producers being 15.00c, delivered, Oct. 25 and today. In line with this reduction, prices of casting copper and scrap copper have been marked down sharply. Copper now is selling at close to the low point of the spring of 1919, which in turn was the lowest level since early in 1915.

Tin prices dropped heavily on the strike news from London last week, but recovered this week on the better outlook in the labor situation as cabled over Sunday. Spot Straits tin sold on the New York metal exchange Monday at 39.30c, while October-November shipment sold at 40.50c, and today the market recovered about 1c further. A considerable amount of tin still is held in New York, some being owned by importers and dealers and some held for account of consumers who have asked that shipments be held up. Buying of tin has improved somewhat, principally by consumers who have high priced tin and want to equalize the cost with low priced purchases. The statistical position of the market is not yet really satisfactory. About 4000 tons of tin arrived in this country the first three weeks of the month, exclusive of 1100 tons of tin ore. However, shipments from the Straits the first half of the month were only about 1500 tons, the smallest for any two weeks in a considerable period. It is believed the pressure on the Singapore market caused by the general business depression and break in commodity prices in the East Indies has about been completed.

The zinc market has been dull and weak. Prime western has been declining gradually, selling down to 7.00c, East St. Louis, Oct. 25. Today the market was 7.05c to 7.15c. The ore operators in the Joplin field closed their works for a two weeks' shutdown recently, to resume on a reduced scale Nov. 1. Consumers, particularly galvanizers have been ordering shipments on old contracts to be made, so that the stocks at smelters should show a reduction for October.

The lead market has been easy. Spot lead sold down to 6.75c, New York, while domestic lead for prompt shipment was obtainable down to 6.62½c, East St. Louis. The New York market now is below the import cost, so that the London, New York and St. Louis have resumed a more nearly normal relationship.

The antimony market has been quiet with large lots quoted 6.37½c to 6.50c, New York. This is slightly below the cost of import.

The aluminum market has been extremely dull. Small lots of virgin ingot 98 to 99 per cent are to be had for 29.00c to 30.00c, New York, for spot delivery, in the outside market. The same grade for shipment from abroad this year, is quoted 28.00c, c.i.f. New York. Next year's contracts for foreign aluminum are quoted 30.00c to 31.00c. Sheets for importation have been offered down to 37.00c, base, while spot sheets in New York are quoted 45.00c to 47.00c.

Brass and copper products have been following the copper market down, charging 1c to 2c at a time on several days recently, the last change coming yesterday. High brass rods now are 20.25c, seamless tubes 27.00c, seamless copper 28.00c, copper sheets 25.50c, brass sheets 22.25c. These prices are within about a fourth of prewar figures.

Report War Surplus Sales

Washingon, Oct. 26.—Proceeds from the sale of surplus war materials up to Oct. 8 netted the war department $763,401,326.18 on material that cost it $1,056,090,385.68, says a statement by the deparment. This makes the percentage of recovery to Oct. 8 approximately 63 per cent. On nonferrous metal sales the recovery is claimed to be 50 per cent; on hardware 42, on machinery and engineering equipment 52, on railroad rolling stock 87 and on railway material 66. Sales to date of surplus nonferrous metals have totaled $32,344,790, of hardware $2,669,922, of machinery and engineering equipment $9,105,923, of railroad rolling stock $100,144,912, and of railway material $6,251,502. Nonferrous scrap sales to Oct. 8 aggregated $18,004,849.

More Cars

Are Allotted for Oil Country Shipments of Tubular Goods

Washington, Oct. 26.—Interstate commerce commission has issued to the Steel & Tube Co. of America, Chicago, a permit for four open top cars daily with sides higher than 38 inches for the movement of pipe and tubing to the oil fields. This permit, which is effective until Nov. 19, calls for half the number of extra cars the company had been getting up to the termination of all special permits on Oct. 19. A temporary permit for the movement of steel sewer pipe has been granted to Bayonne, N. J. These permits, with the one of last week giving pipe and tube mills in the Pittsburgh, Youngstown and Lorain districts 60 additional open-top cars daily, are the only permits reported by the commerce commission to have been granted to the iron and steel industry since it issued a sweeping order canceling all outstanding permits. The commission's order abrogated 633 permits and restored some 80,000 open top cars for coal loading, a large part of the 80,000 cars being withdrawn from the iron and steel industry.

Freight loading continues heavy despite a reported decrease in the offerings of freight, and in the week ended Oct. 9 the roads loaded 1,009,787 cars of revenue freight. This is the first time this year loading has exceeded 1,000,000 cars in any week, and is within 2000 cars of the best week in the history of the carriers. Loading of coke in the week ended Oct. 9 was 15,431 cars, against 8655 cars in the same week last year. Ore loading amounted to 79,214 cars, compared with 54,950 in 1919, and coal loading 229,976 cars, against 224,617 in the same week of 1919. A report of the interstate commerce commission for the seven months ended with July gives the increase in freight traffic 17.1 per cent.

The finance division of the commerce commission reports that a total of $56,190,325 has been advanced to the carriers from the $300,000,000 revolving fund for meeting maturities and purchasing new equipment. It is estimated that these advances have made possible the financing of equipment orders of slightly more than $100,000,000. Recent advances include $200,000 to the Chicago, Indianapolis & Louisville railroad for the construction of a steel car repair shop at Lafayette, Ind., and $300,000 to the Central New England Railway Co., for additions and betterments which will cost $500,000.

The car service division of the American Railway association reports that demand for automobile cars has fallen off sharply.

Continues Fabrication in Transit Privilege

Washington Oct. 26.—Proposed cancellation of provisions permitting fabrication in transit at St. Louis of structural iron and steel from Pittsburgh and other points of origin to Memphis, New Orleans and other lower Mississippi valley destinations has been found not to be justified by the interstate commerce commission. The Missouri Pacific railroad last July sought to cancel certain provisions in its tariff permitting fabrication in transit at St. Louis, in connection with joint rates on carload shipments of structural iron and steel from Chicago, Gary, Ind., and points east of the Indiana-Illinios state line to Memphis, New Orleans and other points, thereby making applicable higher combination rates based upon St. Louis. On protests by the St. Louis chamber of commerce, the St. Louis Structural Steel Co., and other interests the schedules were suspended until Nov. 25. The decision of the commerce commission is favorable to the St. Louis interests.

Protests Plea To Lower Chicago Export Rate

Washington, Oct. 26.—"Pacific port routes are under a disability as compared with Atlantic port routes in the movement of export traffic from Pittsburgh to the Orient, which disability is due solely to the geographical location of Pittsburgh, and cannot participate in the movement of traffic except upon an equalization of rates," states the railroad administration in answer to the complaint of the Inland Steel Co., Chicago, that railroads discriminate against it in maintaining on iron and steel articles from Chicago to Pacific ports for export the same rates that apply from Pittsburgh. "In making such equalization carriers to Pacific ports have not given to Pittsburgh any advantage which it would not otherwise enjoy, while in applying the same rate from Chicago they have given its manufacturers the benefit of a lower rate than would be justified except for the competitive influence of the Pittsburgh rate via Atlantic ports."

Lower export iron and steel rates from Chicago than from Pittsburgh to Pacific ports, when previously in effect, were not due to any recognition upon the part of the carriers of the principle of graded rates, but solely to the fact that the through rate from Pittsburgh was so low that the carriers could not afford to meet it via Pacific ports, the railroad administration contends.

In a brief, setting forth additional reasons why the Chicago-Pacific coast rate should be made lower than that from Pittsburgh, the steel company asserts:

"There is not a steel product or an iron product consumed in the Orient that cannot be had in Chicago in the volume demanded. It would be to the interest of the western carriers to have all steel for the Orient purchased at Chicago and move by rail to San Francisco. The minimum division carriers east of Chicago will accept out of the 80-cent rate has been 11.2 cents. On business from New York the minimum acceptable to carriers east of Chicago is about 18 cents, leaving carriers west of Chicago 62 cents."

Trade Board Delays Action in Cost Data Case

Washington, Oct. 26.—Delay on the part of the federal trade commission in seeking modification of the injunction in the district supreme court that it might prosecute the mandamus suits against the Bethlehem Steel Co. and the Republic Iron & Steel Co., has given rise to the report that the commission has finally abandoned its cost reporting program, though at the commission's headquarters here it is asserted some action may be looked for shortly.

The commission now lacks both a chief counsel and an assistant chief counsel, and this is said to have caused delay. However, return of Commissioner Nelson B. Gaskill from his vacation will settle all doubts over the case, as Gaskill last spring took personal charge of the matter. Soon after the commission brought action at Trenton, N. J., and Philadelphia, against the Republic and Bethlehem companies, these two and 20 other companies went into the district supreme court here and enjoined the commission from any further attempt to force submission of production cost data by iron, steel and coke producers.

The commission announced last spring that on the return to the bench this fall of Justice Bailey, who granted the injunction, it would ask that it be modified so the test suits at Trenton and Philadelphia could be pushed. Justice Bailey has been back three weeks, but is on the criminal bench this term. Since any decision in the Trenton and Philadelphia actions will be carried to the United States Supreme Court, a final decision apparently is close to two years distant. Meanwhile, cost reporting is on a voluntary basis, and outside of one large interest, practically none is reporting.

Curtail Output

Of Automotive Plants in Detroit—Expect Business Revival

Detroit, Oct. 25.—Curtailment of production now is the policy of the automotive industry in general. This situation which has been coming to a climax during the last two months now finds dealers with an excess supply of cars and trucks on their hands, consumers holding back orders and awaiting improved credit conditions. The slowing down has caused some unemployment in Detroit, but the situation is declared to be no worse than exists in other centers. The peak of employment appears to have been last April when approximately 310,000 men were on the payrolls of Detroit factories, the bulk being engaged in the automotive and allied industries. The number now employed is placed at 245,000, a decrease of 55,000 or about 17 per cent.

Employers do not believe the situation is one to cause apprehension and in fact a number anticipate a pronounced business revival to follow the coming elections. Mayor James Couzens has appealed to manufacturers to ration employment, so that unemployment may be kept at a minimum. The Michigan Manufacturers' association has asked the city to proceed at once with $37,000,000 worth of sewer and water works construction, recently authorized, as a means of creating employment.

"Undoubtedly we are in a period of depression and readjustment," says Alvan Macauley, president of the Packard Motor Car Co., "but the fundamental conditions are good. The lull in buying affects all lines, but I believe that it is only temporary and improvement will be rapid after the elections."

In other cities of Michigan, industrial conditions closely parallel those in Detroit. Kalamazoo, the center of the coated paper industry, is reported running at 80 per cent of normal; Jackson is down to 48 per cent; Muskegon, 50; Saginaw, Bay City and Lansing, 70; Grand Rapids, 60 to 70, and Flint and Battle Creek, 80 per cent.

The Pere Marquette railway is completing a reconstruction program involving the expenditure of $5,782,000. This work involves the laying of 275 track miles of 90-pound rails on the principal operating divisions; the purchase of 12 Pacific type locomotives; the creation of a new division terminal at New Buffalo, Mich.; the purchase of 12 all-steel passenger coaches and 12 steel baggage and express cars; and the construction of a bridge over the Thornapple river. At Saginaw, Mich., improvements costing $600,000 are being made, including a machine shop and power house. Similar improvements are being made at Plymouth, Mich., at a cost of $325,000.

Holds Lever Act Section Is Unconstitutional

The fourth section of the Lever act was declared unconstitutional in the United States district court at Pittsburgh, Oct. 21, when Judge W. H. Thompson dismissed the government's petition for an order of removal of several railroad men, to Chicago, where they had been indicted for conspiracy to violate the section. An appeal to the court of appeals for the third district has been taken by the government.

J. Thomas Hoffman, counsel for the men, opposed the government's petition for removal. The three men were accused of interfering with the transportation of food, fuel and other necessaries, thus conspiring to defeat the statute as amended. They denied any conspiracy.

"Agricultural workers may with impunity, wilfully and for purpose of enhancing the price, destroy, waste or hoard the necessities which come from the farm," the opinion says. "These thousands might form a gigantic combination through any unfair devices or discriminating means to limit the production or restrict the supply and distribution of these necessities that they might make greater gains by extorting excessive profits, and yet such acts, while utterly destructive of the purpose of the statute, would receive the sanction of the law, while these very same acts, committed by other persons not in the favored classes, would make him a criminal and deprive him of his property or liberty or both. Surely such classification is unjust and arbitrary in the extreme, violating both the letter and the spirit of the fifth amendment of the constitution."

Ask Freight Rate Advance on Sheet Bars

Youngstown, O., Oct. 25.—Railroad traffic authorities are asking shippers and consumers of sheet bars to consent to an advance in rates between certain points. These are special rates granted years ago and all are below the billet rate. When various rate increases went into operation during the war, and also the 40 per cent increase effective recently, the special sheet bar rates were advanced proportionately but no action was taken toward bringing them to the billet level.

Some years ago a special sheet bar rate was established between this city and Warren. The railroads now declare that this and certain other rates are so far out of line as to be illogical and to be discriminatory between shippers. A traffic authority, commenting on the sheet bar rates, declared they were made years ago because of the heavy movement of the commodity between certain points.

Holland Builds Furnaces

Plans and purchases are under way for the construction of two blast furnaces at Ijmuiden, Holland, according to Freyn, Brassert & Co., Chicago, who have been named consulting engineers for the Royal Netherlands Blast Furnace & Steel Works Co. The plant is planned along American lines throughout, including the furnaces, hot blast stoves, ferro-concrete bins, gas washing, charging, blowing and other equipment. This plant will be the first application of American practice in furnace lines, filling, blowing and general operation with continental ores and cokes, and the decision for its construction was reached only after investigation.

Will Rebuild Second Stack

Following the rebuilding of blast furnace No. 4 of the Algoma Steel Corp., Ltd., Sault Ste. Marie, Ontario, Canada, Freyn, Brassert & Co., Chicago, have been re-engaged as engineers in the rebuilding of stack No. 3. In the remodeling of the first furnace, the lines were changed considerably from the original installation. A new hearth and bosh were installed, and the furnace height increased by the addition of a new dome top to the existing shell including a gas seal, receiving hopper and throat. New offtakes and downcomer were provided; the skip incline was remodeled and a coke oven built

Leases Zinc Ore Mines

The Allied Development Co., a new organization, incorporated under Indiana laws for the purpose of mining and marketing zinc ore, has leased 10,000 acres in Hamilton county, Indiana, which will be opened for immediate development. The discovery of zinc ore was made by Arthur Becker, of Indianapolis, a chemical engineer, who served in the governmental chemical department during the world war. He says the zinc deposits, as regards quantity and quality, are the best uncovered in the central states. Veins from 6 to 24 feet in thickness, within 100 feet of the surface have been located and some samples of ore submitted to W. N. Logan, state geologist, have tested 25.92 per cent zinc.

Greater Earnings

Shown by Steel Corporation for the Third Quarter Period

Third quarter earnings of the United States Steel Corp. show sharp gains over both the preceding three months and the corresponding period one year ago. Total earnings were $48,051,540 as compared with $43,155,705 earned in the June quarter and $40,177,232 for the quarter ended Sept. 30, 1919. The company's surplus for the period was $17,869,939. Three months ago the surplus was $13,776,833 and one year ago it was $11,105,167. The usual quarterly disbursement of 1¼ per cent on the common stock and 1¾ per cent on the preferred stock was made. The tabulated comparative income account for the three months of the year follow:

	1920	1919
Earnings after operating expenses, federal taxes, etc.	$48,051,540	$40,177,232
Depreciation and sinking funds	12,312,403	11,065,803
Net income	35,739,137	29,111,429
Interest and bond premium	5,210,498	5,347,562
Balance	30,528,639	23,763,867
Preferred dividend	6,304,919	6,304,919
Common dividend	6,353,781	6,353,781
Surplus	17,869,939	11,105,167

Both July and September earnings were higher than any preceding month since the armistice. August dropped below earnings for the other months of the quarter. The monthly earnings for the period compared with one year ago follow:

	Monthly earnings 1920	third quarter 1919
July	$16,436,802	$13,567,100
August	15,440,416	14,444,881
September	16,174,322	12,165,251

Hardware Men Advocate Repeal of Profits Tax

Repeal of the excess profits tax was urged and the enactment of "something more fair, more certain and more just," was advocated at the closing sessions of the convention in Philadelphia of the American Hardware Manufacturers' association and the National Hardware association.

In addition to this the organizations went on record as being opposed to the proposed metric system of weights and measures, and although several speakers urged a sales or consumption tax, the convention did not declare itself on the proposition.

New officers of the American Hardware Manufacturers' association are: President, W. D. Biggers, Detroit, succeeding F. H. Payne, Greenfield, Mass.; vice presidents, Murray Sargent, New Haven, Conn., G. O'Brien, Rochester, N. Y., and Isaac Black, New Britain, Conn., secretary-treasurer, Frederick D. Mitchell, New York and members of the executive committee, W. A. Graham, Wallingford, Conn Charles M. Power, Pittsburgh, Robert G. Thompson, Saginaw, Mich., H. Sanborn Smith, Birmingham, Ala., H. C. Atkins, Indianapolis, W. H Cowdery, Cleveland, S. M. Stone, Hartford, Conn., B H. Swift, Fremont, O. and Walter M. Taussig, New York.

A. S. M. E. Elects Officers and Adopts Program

Edwin S. Carman, secretary and chief engineer, Osborn Mfg. Co., Cleveland, has been elected president of the American Society of Mechanical Engineers in a mail ballot covering the membership of 13,000. Mr. Carman succeeds Maj. Fred J. Miller, New York, and will take office after the society's annual convention to be held in New York in December. John L. Harrington, consulting engineer, Kansas City; Leon P. Alford, editor, New York, and Robert B. Wolf, president R. B. Wolf Co., New York, were chosen vice presidents for two years. Three managers were elected as follows for a term of three years: Henry M. Norris, Cincinnati; Carl C. Thomas, Los Angeles; and Louis C. Nordmyer, St. Louis. Maj. William H. Wiley, New York, was re-elected publisher. The finance committee of the society has recommended a budget of more than $500,000 for the ensuing year. The publication committee reported that the society's publications for the year had involved an expenditure of more than $200,000. The engineering foundation fund for engineering research, which was established in 1914 by Ambrose Swasey and which is administered by the engineering foundation board, shortly will amount to $1,000,000. John H. Barr, New York, formerly professor of machine design at Cornell university, has been appointed the society's representative on the national research council for three years, succeeding W. F. M. Goss, New York. Fred J. Miller, retiring president, was named a member of the John Fritz medal board to fill the vacancy created by the death of John Alfred Brashear, Pittsburgh.

The council of the society has adopted a recommendation from a special committee on industrial engineering, whose chairman is Dean D. S. Kimball, Cornell university, to the effect that immediate steps be taken "to formulate a practical program of industrial relations which will express the viewpoint and beliefs of engineers."

Building Scandal

Involves Contractors and Labor Leader—Steel Contracts Affected

New York, Oct. 25.—What promises to be one of the biggest building scandals in the history of the country and what will in all probability lead to investigation of building activities in other large cities is now being unfolded in testimony before the Lockwood housing committee in its sessions at the city hall in this city. Irregularities for the past several years in this city involve building operations running into millions of dollars, it is shown.

Extortion by unscrupulous labor leaders under threat of strike, a threat frequently put into operation, control of bidding and unlawful combinations in building materials are among the irregularities indicated by the testimony. Robert P. Brindell, president of the Building Trades council, alleged to have accepted a $25,000 bribe for calling off a strike, and John T. Hettrick, a lawyer of 165 Broadway, charged with having absolute control of bidding, are among the leading figures implicated. Otto Eidlitz, head of the Building Trades Employers' association, and said to have control over Brindell, also is mentioned.

In outlining the course of the inquiry, Samuel Untermyer, associated counsel of the committee, asserted that he intends to show a banding together among the material men, first, in separate associations in each line of 32 lines engaged in building materials from the manufacturer down to the retailer, and then the banding together of the different associations under the head of the Building Material Employers' association."

"Not only has labor been dragged into the trades council, in many instances", Mr. Untermyer declared, "but employers also have been coerced into joining an association by the relation that exists between the Building Trades council and the Building employers' association".

Exposure of the alleged methods of Hettrick in controlling bidders and of Brindell in controlling and calling off strikes, has resulted in four of the five contracts placed thus far in connection with work on the proposed $20,000,000 court house being revoked. These included a $1,277,000 contract to the Bethlehem Steel Bridge Corp. for steel works.

Governor Smith will be asked to appoint Attorney General Charles D. Newton as special prosecutor in a criminal action before the extraordinary grand jury against those implicated.

Strike Throttles British Works

Million Men Idle in Iron and Steel Industry as Additional Furnaces and Mills Suspend—Scotland's Steelworks Raise Prices—Shipbuilders Cancel Orders—Continuation of Miners' Negotiations Hopeful Sign

The Iron Trade Review Staff Cable

European Headquarters,
THE IRON TRADE REVIEW,
2-4 Caxton House, Westminster, S. W. 1

Sterling—$3.47

LONDON, Oct. 26.—Additional blast furnaces have blown out or damped down as a result of the coal miners' strike, and only a few isolated units continue in operation. All of the large steelworks have been closed and the smaller works will suspend by the end of this week. One million men in the iron and steel and dependent industries have been made idle by the coal strike, in addition to the 1,000,000 miners who are out of work.

While the situation remains exceedingly dark, a more hopeful attitude is apparent in regard to the possibilities of an early settlement of the strike. The government has reopened informal discussions with the miners' officials. The latter demand an unconditional increase of 2 shillings per shift, while the government is just as insistent for an increase in output. The miners claim they do not have sufficient control of operations to guarantee increased production, and a new basis of negotiation may be found in the giving of guarantees by the owners in regard to operations distinctly under their control. A still more hopeful sign is the fact that the railwaymen have withdrawn their threat to strike immediately.

Shipbuilding has been seriously disabled and extensive cancellations of orders from this source are reported. Many Welsh steelworkers are said to have departed for the United States. Some of the Scotch steelworkers have raised quotations. Belgian billets have been sold in Great Britain for £16 ($55.52), while American wire rods are offered here at £28 ($97.16), delivered. Belgian nut and bolt iron is selling at £22 ($76.34 per ton.

British foundries are running on half time in order to prolong employment, the proprietors seeking to assist their men, as much as possible.

Britons Unable To Sell Steel; Costs Remain Up

European Staff Correspondence

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation Street.

Sterling—$3.49

BIRMINGHAM, Eng., Oct. 15.—Announcement of the determination of the miners to strike marked the end of the most unsatisfactory quarterly meeting of the Birmingham metal exchange in years. There was a large attendance but scarcely any business. It is generally recognized by buyers and sellers that prices must come down substantially if business is to be done. Sellers have adopted a waiting attitude, and in view of high cost of production manufacturers hesitate to reduce quotations to make them competitive with those of foreign countries, especially Belgium.

The only market showing any strength is pig iron. Concessions are few and far between. It is reported that Scotch pig iron has been reduced 10 shillings ($1.75) per ton.

It is significant that the makers of heavy rolls for iron and steel works have just advanced their prices for grain and chilled rolls £1 10s ($5.24) per ton, owing to the last increase in cold blast and high class foundry iron.

Everybody agrees that the steel trade must face a trying time during the next few months. Home production is constantly increasing, and it is significant that the output of steel ingots and castings was 883,900 tons during September, the highest figure attained since the armistice. On the other hand, orders have fallen off seriously and the large new mills recently set in operation are wanting business. Foreign competition has become serious. A typical example of the state of things may be cited with regard to a Sheffield house which recently invited a merchant to dispose of 70 tons of 6-inch billets, being the excess production on a certain contract. They were offered at £22 ($76.78) per ton, and when the merchant expressed his doubts as to his ability to dispose of the steel at this price, the manufacturer offered to submit his cost sheets to show that they had actually cost £22 ($76.78) to produce. The steel was offered to 20 consumers, none of whom would consider the matter. Belgian 2-inch billets are being offered here in 1000-ton lots as low as £17 10s ($61.18), delivered. The Welsh Siemens Steel association has lately reduced its price for tin bars and sheet bars from £23 10s ($82.02) to £21 ($73.29). This is merely a formality as the metal has been selling for the last fortnight at the lower figure.

The wrought iron industry continues to occupy a fairly strong position, the ironmasters being fairly well fixed with orders. For best iron the demand is almost as good as ever, but for lower qualities the keen Belgian competition has weakened the position. Bar iron from Belgium is being offered in the Black country as low as £22 10s ($78.53) For the better class of iron peculiar to South Staffordshire the makers are able to obtain their basis price of £30 10s ($106.45), and they have been able to add an additional 5 shillings (88 cents) for deliveries in the London area. There are still fairly good reserves of orders booked at premium prices of £1 ($3.49) to £2 ($6.98) above the basis. Skelp for tube making continues in great demand, some makers claiming that they are booking at £35 ($122.15) per ton.

Several makers of tinned sheets have reduced their prices £4 ($13.96) per ton.

Galvanized sheets have had a further decline of about £1 ($3.49), recent sales having been made at £39 ($136.11) to £40 ($139.60) per ton. Some recovery is hoped for in this department. China is expected to come into the market shortly. Black sheets are not quite so weak as galvanized, and the difference in the selling price between the two is much narrower than usual. Tin plates have had a further fall to 48 shillings ($8.37). Buyers are endeavoring to place forward orders at 45 shillings ($7.86), but so far the makers have declined to entertain this figure.

Current Iron and Steel Prices of Europe

British Market

Corrected to Date by Cable

Home Market Prices. Gross Tons at Works or Furnace

SEMIFINISHED STEEL

	£	s	d	$
Billets, soft steel	20	10	0	71.14
Sheet bars	21	0	0	72.87
Wire rods	30	0	0	104.10

FINISHED STEEL

Steel bars, England, ½ to 3 inch	29	0	0	100.63
Ship plates, England	27	0	0	93.69
Ship plates, Scotland	27	0	0	93.69
Beams, England	24	0	0	83.28
Sheets, black, 24 gage	35	10	0	123.10
Beams, Scotland	24	0	0	83.28
Sheets, galvanized, 24 gage	38	10	0	133.60
Rails, 60 lbs. and over	25	0	0	86.75
Tin plate, base box 108 lbs.	2	6	0	7.98
Steel hoops	34	10	9	119.72

PIG IRON*

West Coast Hematite	14	15	0	51.18
Hematite, East Coast Mixed Numbers	13	0	0	45.11
Middlesborough Basic	11	15	0	40.77
Middlesborough No. 3	11	5	0	39.04
No. 3 Foundry, Derby, Leicester, Nottingham	14	5	0	49.45
No. 3 Foundry, Northamptonshire	13	15	0	44.24
No. 3 Foundry, Staffordshire	13	10	0	46.85
No. 3 Scotch Foundry	13	0	0	45.11
Ferromanganese, 80 per cent	37	0	0	128.39

COKE

Yorkshire furnace	3	5	0	11.28
Yorkshire foundry	4	5	0	14.75

French Market

Prices Last Reported

PIG IRON

	Francs per metric ton (2205 lbs.)	$
Hematite, Lorraine	855 to 915	55.69 to 60.60
Foundry, Longwy, 3 per cent Si., sand-cast	600	39.78
Foundry, Longwy, 3 per cent Si., chill-cast	650	43.10
Foundry, Longwy, 2 per cent Si., sand-cast	597	41.77
Foundry, Longwy, 2 per cent Si., chill-cast	630	41.77

COKE

French furnace	245	16.24
German, Belgium and British furnace	270	17.90

SEMIFINISHED STEEL

Blooms	973 to 979	64.51 to 64.91
Billets	973 to 979	64.51 to 64.91
Sheet bars	1223 to 1250	81.08 to 82.88

FINISHED STEEL

	Francs per 100 kilos (220 lbs.)	$
Merchant bars	140	9.28
Angles	145	9.61
Normal beams and profiles	140	9.28
*Plates bridge and tank, 5 millimeters and thicker	184½	12.23
*Sheets, black, 3 millimeters	192 to 199	12.73 to 13.19
Bars, cold-drawn, 40 to 60 millimeters round	220	14.59

Pig iron prices are f.o.b. furnace; semifinished steel prices f.o.b. works, finished steel prices, according to the schedule of the Paris Consortium of Iron and Steel dealers, delivered, except (*) which are from schedule of the Comptoir des Toles.

Belgian Market

Prices Last Reported

PIG IRON

	Francs per metric ton (2205 lbs.)	$
Foundry, 3 per cent silicon, Belgium	540 to 550	38.49 to 39.22
Foundry, 3 per cent silicon, Luxemburg	650	46.35
Basic, open-hearth, Belgium	575	41.00
Basic-bessemer, Belgian	525	37.43
Basic-bessemer, Luxemburg	525 to 550	37.43 to 39.22

SEMIFINISHED STEEL

Blooms	675 to 750	48.13 to 53.48
Billets	750 to 775	53.48 to 55.26
Sheet bars	800 to 850	57.04 to 60.61
Wire rods	1150	82.00
Standard rails	925 to 950	65.75 to 67.54

FINISHED MATERIAL

	Francs per 100 kilos (220 lbs.)	$
Merchant bars	92½	6.58
Normal beams and profiles	92½ to 95	6.58 to 6.74
Plates, 5 millimeters and thicker	125	8.91
Plates, 3 to 5 millimeters	135	9.63
Sheets black, 3 millimeters	137½	9.80
Plain wire	385	27.45
Sheets, galv., 1 millimeter	270	19.25

*Sold on same basis as semifinished material.
†Plus 50 francs for export.
All prices f.o.b. furnace or works, except finished material, for which delivered prices are quoted.

Seize Italian Plants; Tie Up Industry

European Special Correspondence

MILAN, Italy, Oct. 3.—Domestic demands for iron and steel are at a complete standstill on account of the very serious differences between the steel companies and the workmen. About a month ago the negotiations were broken, as the companies flatly refused any increase in the wages because of the critical conditions of the industry, almost crippled by the lack of fuel and raw materials and financially shaken on account of heavy taxes and confiscation of war profits voted by chamber of deputies.

Soon after the breaking of the negotiations production in all plants was curtailed from 40 to 60 per cent. After a week, the management of the big Romeo plant in Milan lost patience and declared a lockout of its plant, which was occupied and guarded by the police. The reply of the workmen was prompt and unexpected; the same day of the lockout, all plants belonging to the metal, mechanical and construction industry

Italian Lire—$0.0416

were occupied by workmen; engineers, clerks and superintendents were expelled, red flags were raised on top of the buildings and corps of red guards formed to prevent any attack from the police.

The plan of the workmen organizations was to show that they are able to manage the plants without the assistance of the owners; but such a plan utterly failed after a few days because the workmen recognized that without the help of engineers, clerks and directors the production was negligible. It is evident the workmen will not be able to realize their dream of complete possession of the plants and will probably be content with controlling some form of management and a share of the profits.

In the meantime no material is sold or delivered. Coal, iron and ore orders placed abroad by the plants have been suspended or canceled thus causing great damage to the regular flowing of raw materials into the country. On the other hand the high rate of exchange, which has reached a very high mark during the last weeks, and the uncertainty as to the future, are not encouraging to buyers.

The government has finally intervened in the conflict by announcing a plan which will permit the control of the workmen organizations in the

Market Prices

F.o.b. Italian mills

	Per 100 kilos	Per gross tons
Gas coal	750 lires	$31.50
Pig iron, standard bessemer	1350 lires	57.00
Scrap steel	60 lires	21.00
Steel bars	225 lires	93.00
Wire rods, No. 5	240 lires	96.00
Heavy steel plates	250 lires	96.50
Sheets, blue annealed 1mm.	350 lires	150.00
Beams and shapes	215 lires	90.00
Open-hearth ingots	125 lires	52.00
Open-hearth billets	160 lires	73.00

plants. According to this law, a special committee should be formed by six representatives of the workmen and six representatives of the companies to state the rules as to the best way of effecting such control.

French Readjustment Begins; Coke Falls

European Staff Correspondence

PARIS, Oct. 10.—Two events of the week stand out prominently as affecting the iron and steel market. The *Journal Officiel* has announced a drop in the price of coke from 245 francs ($17.15), for that of French origin, and 270 francs ($18.90), for Belgium, German or British, to a flat rate of 175 francs ($12.25) per metric ton. The decline is likely to be reflected in prices of finished and semifinished products by Oct. 15.

Iron and steel products are announced as being in line for a 20 per

Franc—$0.07

cent reduction, either Oct. 15 or Nov. 1.

Considering that British metallurgical coke, at the ruling rate of exchange, works out at something like 184 francs ($12.88) in the country of its origin, French metallurgy may now be said to be placed on as favorable a plane as that of England. The situation with regard to Germany and Belgium is not so favorable, the equivalent in the case of the former being 80 francs ($5.60) and the latter 130 francs ($9.10).

France exported iron and steel in the first six months of 1920 to the value of 428,000,000 francs ($29,996,000) as compared with 14,000,000 francs ($980,000) in the same period in 1919. Exports of machine tools in the same period rose to 142,000,000 francs ($9,940,000) from 41,000,000 francs ($2,870,000). It would be most interesting to know they were invoiced at the high ruling prices applying in France.

Belgian Markets Easier; Iron Plentiful

European Staff Correspondence

BRUSSELS, Oct. 10.—Belgium has not as yet taken any steps to counteract the effects of a decline in prices of iron and steel products so imminent in France. The country does, however, hold an advantage in the price of its coke, 130 francs ($9.10) per metric ton, as compared with the new controlled price of 175 francs ($12.75) in France.

Market conditions are easier in Belgium than they have been for some time, and prices are less a matter of negotiation. No price changes are noted

Franc—$0.07

save with respect to Luxemburg foundry iron, which is now 550 francs ($38.50), as compared with 650 francs ($45.50) previously. Luxemburg basic bessemer iron is being sold in the Belgian market. This grade is at a new low figure of 525 francs ($36.75).

Slight fluctuations are noted in steel, but base prices hold, save for export, where as usual prices are generally quoted at 50 francs ($3.50) per ton increase. The attitude of Belgium in respect to exports now that prices have begun their downward course in France may be expected to produce a marked change at some time not far distant.

The market as a whole has become more stabilized largely because of a belief on the part of Belgian metal workers that the industry has become more prosperous than was expected, and their desire to participate in these benefits.

Belgian coal production remains satisfactory and 300,000 tons have been arriving monthly from Germany.

German Trade Dull; Big Profits Made

European Special Correspondence

DÜSSELDORF, Germany, Oct. 11.—Business in the iron and steel markets is very dull, and production is exceeding the demand. Foreign consumers refrain from buying, believing that the German works soon will be compelled to make further and material price reductions in consequence of lack of orders. In the world market, the recent competition from England and America could well be met, but in the last week the offers from Belgium, Lorraine and the Saar have made German business much more difficult.

The transport situation on the railways and waterways still is favorable and will remain good if no political disturbances occur. The labor situation also is developing favorably. Workmen have become more reasonable than they were in the spring.

As regards German iron ore, the situation is unchanged, but as to foreign ores, offers exceed the demand. While best Bilbao-Rubio ore is offered at 45 shillings ($8.10) per ton, c.i.f. Rotterdam, basis 50 per cent iron, other good Mediterranean ores are being offered freely at 35 shillings ($6.30) c.i.f. Rotterdam. Indian manganese ore is weak at 4 shillings 6 pence (81 cents), per unit c.i.f. Antwerp or Rotterdam.

Scrap iron prices are firmer at 900 to 1000 marks, per ton, f.o.b. sellers' works.

Demand for pig iron still exceeds production, and relatively great quantities of foreign pig iron is imported. As to blooms, billets and other semifinished material, works have their books full of orders, and it is difficult to place new business.

There is little demand for railway material because of the miserable financial position of the state railways. New material is too expensive, and the state cannot build new lines or buy new cars.

The market for steel bars is dead. The works are operating only three or four days a week. Demand for plates cannot be satisfied in consequence of the activity in shipbuilding. The home and export markets for sheets are flooded. Export business in tubes shows more life, but there is no domestic business. The situation pertaining to machinery makers is very serious, as both domestic and export buyers are out of the market.

The annual reports of all German iron and steel works show greater profits than ever. Even during the war such profits were not earned. At the same time, the leaders, such as Stinnes, Thyssen and Stumm are buying other works, and if their buying continues the German iron and steel industry will be represented in a year's time by only four or five big companies.

Institute Holds Largest Meeting

More than 1500 Attend Eighteenth General Meeting—Hopeful Note on Business Conditions Sounded by Judge Gary—Invitation to American Iron and Steel Makers To Visit French Industry Is Considered

WITH an attendance that exceeded all previous gatherings the eighteenth general meeting of the American Iron and Steel institute at the Hotel Commodore, New York, Oct. 22, proved to be one of the most notable in the history of that organization. The enrollment was between 1500 and 1600. The meeting was characterized by a marked appreciation of the changing business conditions and their effect but the tone was one of cheerful acceptance of whatever was necessary to restore a sound and stable foundation to the national economic situation.

In view of the uncertainty in the general business situation, that portion of Judge Gary's address which dealt with present conditions and prospects aroused the keenest interest. Judge Gary expressed a hopeful view of the situation as a whole and struck a note of confidence as to the future. He laid stress upon the unwholesome level of prices which had existed in many lines in recent years. He called for a reasonable and just attitude on the part of the iron and steel producers in making such reductions in their products "if and when other reductions and costs permit." He pointed out the power of the iron and steel industry because of its size and basic character, to exert a steadying influence at this time and appealed to the assembled manufacturers to make the most of their opportunity. Judge Gary gave over a large part of his address to presenting his observations of European industrial and political conditions gained on the extended tour abroad from which he recently returned.

Whether the iron and steel producers of the United States will accept the invitation from the French industry to visit that country and participate in an international meeting, during the next year, was not acted upon at the meeting. The matter will be passed upon later by the directors of the institute. Judge Gary acknowledged the invitation from the French in his presidential address.

Tells Members of Institute's World Standing

JUDGE GARY, when he appeared to call the opening session to order, was greeted with prolonged applause, which he acknowledged by appropriate remarks introductory to the presentation of his formal address. "This reception certainly is worth living for," he said. "It is especially pleasing to me, because I know when you applaud, you are really voicing your sentiments in favor of the American Iron and Steel institute. I am glad to assure you that from my own experiences, I believe this institute is known and respected throughout the entire world. We could hardly have imagined that outside of our own organization, we could have made such progress, or could have so firmly established ourselves in an institution which commands the utmost confidence and esteem not only of the iron and steel industry of the world but of all other lines of intercourse. Our industry, since it has been established, has always been considered the basic or at least one of the basic industries of the world. That means what the industry does and what it stands for, is bound to have the influence on the whole industrial situation. Therefore, all Americans who are connected with this line of activity are proud when they travel abroad to hear the words of praise regarding their industry. I think we are all to be congratulated that we are members of the American Iron and Steel institute."

Following the presentation of Judge Gary's formal address, which was warmly received, the program of papers and discussions was given. "Recent Developments in the Iron and Steel Industry of India," by C. P. Perin, New York City, consulting engineer for the Tata Iron & Steel Co., was presented with slides by F. L. Estep, an associate of the author. The other paper of the morning session was on "Foreign Trade," by A. H. Holliday, manager of exports of the Jones & Laughlin Steel Co. At the afternoon session, the papers presented were: "The Basic Open-Hearth Process," by F. L. Toy, superintendent of the open-hearth department of the Homestead Works of the Carnegie Steel Co., with discussions by W. A. Maxwell Jr., assistant general superintendent of the Cambria Steel Co., Johnstown, Pa., and S. J. Cort, superintendent of the open-hearth department of the Bethlehem Steel Co., South Bethlehem, Pa.; "A Review of the Development of Copper Steel," by D. M. Buck, metallurgical engineer of the American Sheet & Tinplate Co., Pittsburgh, with discussions by J. S. Unger, of the Carnegie Steel Co., Pittsburgh, and Dr. A. S. Cushman, bureau of standards, Washington; "The Use of High Manganese Iron With Basic Open Hearth Tractors," by E. A. Wheaton, superintendent of the open-hearth department of the Bethlehem Steel Co., South Bethlehem, Pa., with discussion by F. D. Carney, metallurgical engineer, New York City; "Heat Treatment of Automobile Steel," by R. R. Abbott, Peerless Motor Car Co., Cleveland, with discussion by J. A. Mathews, vice president, Crucible Steel Co. of America, Pittsburgh; "The Blast Furnace Hearth," by Walther Mathesius, superintendent of blast furnaces, the Illinois Steel Co., South Chicago, with discussion by R. W. Atcherson, superintendent of blast furnaces of the Inland Steel Co., Indiana Harbor, Ind., and W. H. Geesman, superintendent of blast furnaces of the Lackawanna Steel Co.

D. M. Buck, metallurgical engineer, American Sheet & Tin Plate Co., Pittsburgh, in his paper reviewed the development of copper steel. This material, which is said to be noncorrosive and

rustproof, has received considerable attention for several years. Practice has shown that the best results are obtained by alloying with normal open-hearth or bessemer steel, from 0.15 to 0.30 per cent of pure copper. Mr. Buck pointed out that although references are found as early as 1627 relative to the effect of copper on the physical properties of iron and steel, nothing is found pertaining to the control of corrosion previous to the present century. From 1900 on a number of authorities have presented results showing the relative corrosive properties of untreated and copper treated iron and steel.

The importance of the subject is shown by the fact that committee A-5 on corrosion, American Society for Testing Materials, has recently concluded an extensive investigation, in which many types of noncorrosive material were tested. Results of these tests showed that the life of sheet metal is more than doubled by this treatment. Up to the present time copper protected iron and steel has consisted mainly of sheet products. In conclusion, the author shows that the usefulness of the process may be broadened by the use of copper in other steel and iron sections.

Banquet Scene Impressive

The banquet scene was notably impressive. More than 1500 were seated, representing the largest attendance at any similar function in the history of the institute. This called forth from Judge Gary, who acted as toastmaster, the remark that since this banquet had taxed the facilities available to an affair of this kind, it is difficult to see what the institute is going to do in the future, to accommodate the crowd. "It looks to me that it is up to Mr. Schwab or Mr. King to put up a new building for us," he said half facetiously. General Pershing, who was to have attended the banquet, as the chief guest of honor, was unable to be present on account of temporary illness. Judge Gary, in expressing his regret over the inability of General Pershing to attend, referred to the great applause which had greeted his words of praise and appreciation for the achievements of the American overseas commander in his address at the morning session. Toasts were drunk by the diners to General Pershing.

Several of those who usually have been notable figures at the banquets of the American Iron and Steel institute, such as James A. Farrell, Joseph G. Butler Jr., and others, were unable to attend.

"Thrift in Coal," was the subject of a prepared address by George Otis Smith, director of the United States geological survey, which forcibly pointed out the present waste in the nation's fuel supply. Mr. Smith called upon the large industries of the country, led by the iron and steel plants to devote their utmost scientific and engineering efforts to the more efficient use of coal resources.

John A. Penton, president of the Penton Publishing Co., Cleveland, presented an analysis of present day European iron and steel conditions, prepared by H. Cole Estep, European manager of THE IRON TRADE REVIEW, under the title "European Iron and Steel Two Years After the War," with special reference to its influence upon the American iron and steel industry. Mr. Penton in connection with his remarks showed a number of lantern slides, giving diagrams of comparative prices, production, effects of exchange rates, etc., in the international field of iron and steel, as well as a number of views, prewar and present, of iron and steel plants in France, Belgium, Germany and Great Britain.

Mr. Schwab received the customary loud acclaim when he rose to speak. After some remarks in a characteristic and lighter vein, Mr. Schwab paid a tribute to his associates of many years in the iron and steel industry.

"Deep in my bosom there is the lurking feeling that I like to talk to this crowd; and the reason I do is because there is more in business than the dollars and cents," he said. "There is the sentiment in business and the pleasure of having my acquaintances over 40 years of active service in this great industry of ours, that brings a thrill of pleasure and delight to the heart every time you meet them and have the opportunity of talking to them, as I have.

"The profession of the iron and steel worker from the time of Solomon, when he placed them in a place of honor, until today, has been a principal and highly desirable business and profession; it seems to me that the very iron itself permeates its spirit into the soul and into the character of the iron and steel worker, the iron and steel manager, that makes him desirable as a friend and a man of such integrity and parts as you love to meet, know and regard as a friend as long as he lives.

"Long live the members of the iron and steel institute. Long live my friends of 40 years in this great business. May prosperity and happiness always go with it. May they go through life with a laugh, and may they meet their troubles like the mill worker of Homer Williams of Homestead one day, when some strikers threw him in the muddy river, he came out with his clothes dripping with grease and muddy water; he told me what had happened, and I said, 'Old man, what did you say?' 'Oh,' he said, 'I yust laughed.' So let us go through life meeting our troubles with a laugh. Let our attendance at this convention grow year by year, and let the sentiments of friendship and business association grow firmer as each year passes by, and let the younger generation say with the poet of old, in time to come it will delight us to have remembered these days, as it delights me to have spoken to you all here tonight."

The invitation extended to the American industry by the French iron and steel masters to pay a visit to that country next summer previously referred to in THE IRON TRADE REVIEW and mentioned by Judge Gary in his morning address, came up for discussion at the noon meeting of the directors of the institute. No final action in this matter was taken at that time and the proposed trip will be considered further on a later occasion. Nothing was done to fill the vacancy that now exists in the office of secretary of the institute.

Business Paper Editors Elect New Officers

Clay C. Cooper, *Mill Supplies*, Chicago, was elected president of the National Conference of Business Paper Editors for the ensuing year at a meeting held in connection with the annual deliberations of the Associated Business Papers, Inc., at the Hotel Astor, New York City, Oct. 20 and 21. The other officers chosen were: Vice president, C. J. Stark, THE IRON TRADE REVIEW, Cleveland; secretary-treasurer, R. Dawson Hall, *Coal Age*, New York. The executive committee is composed of A. I. Findley, *Iron Age*, New York; C. T. Hawson, *Railway Maintenance Engineer*, Chicago; A. R. Kennedy, *Canadian Machinery*, Toronto; James H. Stone, *Shoe Retailer*, Boston; H. L. Parmelee, *Metallurgical and Chemical Engineering*, New York; and Arthur L. Rice, *Power Plant Engineering*, Chicago.

An interesting program of addresses and discussions of subjects related to editorial policy, preparation and management was presented. Magnus W. Alexander, managing director of the National Industrial Conference board, addressed the assembled editors on the work and purposes of that organization. The editorial conference adopted a constitutional amendment reducing the number of meetings annually from three to two, one of which is to be held in connection with the annual meeting of the Associated Business Papers, Inc. The next meeting of the conference as prescribed will be held at Chicago in the spring of 1921.

Must Help To Stabilize Business

Steel Industry's Influence Can Balance Disturbances Which Readjustments May Provoke—American People Should Not Be Impatient—Have Every Reason for Confidence in Future—Should Co-operate Abroad

BY ELBERT H. GARY

THE life and spirit of the inhabitants of the ravaged countries of Europe, including cities, villages and elsewhere, are not yet the same as before the war, notwithstanding you may have heard the contrary. There is a somber atmosphere, strikingly noticeable to a visitor—less gaiety and liveliness. Cripples are not much in evidence; complaints never heard. Among the masses there is a good-natured, grim, persistent and splendid effort to succeed, to restore and to recover. They realize that hard work is necessary; that they must help themselves to the full extent of their ability; and they are willing and cheerful. They mourn for the loss of home and property and more for the loss of friends, but they are practical and reasonable. They are thrifty, and France and Belgium have a good future in consequence.

Added to this is the all important fact that the governments of the two nations are prompt to consider the interests and necessities of the people. I think it must be admitted that the virulent, obnoxious germ of bolshevism, which means anarchy, the rule of individual force directed against law and order and liberty, has been brought to these countries by vicious, unworthy and selfish persons, and that to some extent others have become innocently involved; others because they are of the criminal class. However, the governments are strong and vigorous and will have the support of the large majority of the people in the protection of property and home and family.

Most of the men, and practically all of the women are industrious and in a measure are or will become property owners, and, especially, do they love peace and progress and prosperity. Millerand, with all his ability, firmness and fairness, and King Albert, with his solid, clear-visioned and noble disposition, backed by their respective parliaments, will be a bulwark against the encroachments of crime and despotism.

On the whole I am of the opinion that both France and Belgium should be well satisfied with conditions and prospects. They are making good progress and with increasing momentum. They are in better shape than I had expected to find them. Both France and Belgium need and deserve all the financial and commercial assistance from the people of the United States that is proper, reasonable and practicable, and this will be accorded. The French are very friendly toward Americans and they are deeply grateful for the service rendered during the war. The relations between these two countries are more cordial and better than ever before, and they ought to be. Emphatically this sentiment also applies to Belgium.

I have heretofore, in addressing representatives of the iron and steel industry of the United States, spoken of the splendid services rendered at critical times by the soldiers of different countries serving with the allies. All this was true and not overstated or exaggerated. None can study the situation on the battlegrounds without being thrilled by the valor, heroism and sacrifices of these men.

On this occasion, I deem it appropriate to briefly allude to the American soldiers in connection with this stupendous world combat. I followed their marches and lines of battle from the start to the finish. Their bravery was never excelled. Their efficiency, hardihood and military success on the average was equal to the best ever known. This is testified to by the leading officers of our associates in the war. They possessed qualities not previously understood or reckoned with by the Germans; and they were victorious by reason of these qualities.

I may mention three instances. At Cantigny, the First division (the first Americans to arrive in France and the first to go into action as an independent factor, secured a substantial victory. Of Chateau Thierry you are perhaps well informed. These successes demoralized the whole German army. They could not then nor ever afterwards recover and re-establish their lines.

Again about two months later, with various successes intervening at Belleau Wood, St. Mihiel and other important places, it was decided by General Foch and others, including General Pershing, to assault the enemy at the Argonne forest.

General Pershing, at his own request, with an army of 1,100,000 strong, was assigned to the task of driving out, capturing or killing the Germans defending. It was argued that no other army, in view of past experiences, would have the dash and even reckless courage to attempt this herculean task. General Foch seems to have appreciated the argument. You know the rest.

This great victory broke the German army's back. There was never afterwards any hope for victory to the arms of the central powers.

When all the facts and figures are assembled, authenticated and published, I think it will be generally admitted General Pershing at Argonne led the largest independent army and gained the greatest single victory in the history of battles. All honor to him and to the multitudes of men under him.

But there is glory enough for all the armies of all the countries who were arrayed against the German soldiers. Except for the brave, efficient, sacrificing and magnificent soldiers of Great Britain, France, Belgium, Italy and their allies, American soldiers and American interests would have been jeopardized, if not destroyed. We cheerfully acknowldge our obligations to all of them.

The right has prevailed. Freedom,

Low Prices Expected

THE present tendency is toward a lower, more reasonable and fairer relative basis. The whole community desires and strives for this. The difficulty is found in the fact that every individual is perfectly willing that all others shall make reductions—the larger, the better. As there was, more or less, a scramble for higher and still higher prices when they were advancing, there will be just as much selfishness in the enforced use of brakes when there is a tendency toward decreasing prices. Now a general public, including particularly those who are neither sellers nor buyers to a large extent, will in one way or another bring about a fair and reasonable adjustment of prices. The law of supply and demand will be the principal factor.

From the president's address to the American Iron and Steel Institute, New York, Oct. 22, 1920.

liberty and justice have been re-established; but at enormous cost. Millions and millions of men have been lost. In the battle-fields are hundreds of cemeteries containing the bones of fallen soldiers of all nationalities. The grave of Quentin Roosevelt, which I visited, is alone in a field where he fell in battle.

I think ex-President Roosevelt was right in desiring to have the body of his son permanently buried where he fell in battle. It is a mistaken judgment on the part of friends and relatives of deceased soldiers to request or wish their remains taken up and removed to the United States. From either a sentimental or practical standpoint, they should be left where they were originally placed.

Although this is a time for courage, composure and caution, the business skies are practically without clouds. As always, there may be showers from time to time, but there is nothing in the atmosphere to indicate the approach of dangerous storms.

In certain lines of the iron and steel industry there have of late been some decreases in the volume of new business and also voluntary reductions in selling prices. I consider this decidedly healthful. All, or nearly all, of us have for months been unable to supply the demands of our customers as to quantities or deliveries and our prices, considered as a whole, have resulted in profits. As a matter of course some adjustments will need to be made. The average of the general scale ought to be reduced equitably and relatively. Without referring to individual cases or lines of general business, I believe in many instances prices have been outrageously high. This observation applies more especially to middlemen, so called, and to smaller departments of industry. It also includes employes in certain trades; but it does not pertain under present conditions to the masses of workmen.

Labor questions are always under consideration in this country and others. It should be constantly borne in mind that, in order to secure the best results to both employe and employer ,mutual confidence and friendly co-operation are essential.

We naturally ask ourselves what shall we personally do; what shall be our attitude in these circumstances? I answer:

We must evidence the same disposition which was displayed before the industrial board, in March, 1919, when our steel committee co-operated with the government's representatives in the endeavor to secure a general, equitable, orderly and methodical reduction in the prices of all commodities and services. We would have succeeded except for the sudden change in the attitude of the administration which resulted in the abolition of the industrial board and thus limited the leaders in the industry to their own resources. Notwithstanding that episode we have done since then much to prevent unreasonable advances and at present we are called upon to exert a further steadying influence upon the general situation. Let us be reasonable and just, reducing our prices if and when other reductions and costs permit, and then with level heads, clear minds and honest convictions, stand solid as against panic or lack of confidence in the industrial situation. Let us strive to be right. If we are right we can be determined and courageous. Let us as individuals consider the interests of all others. Our business is basic. It is perhaps one of the most important. We may, we must, exert an influence for stability throughout the business world at a time when readjustments are, more than usual, liable to provoke disturbed conditions.

Must Admit Truth

IT IS up to the business men and women to maintain certain and continuous business activity in satisfactory volume with fair and reasonable profits. If there should be a serious reaction and depression, which now seems improbable, it will be the fault of those who are connected with business operations or others who, by reason of official positions, improperly interfere, and not because of any fundamental deficiencies in our resources and opportunities. We may without hesitation face and discuss any and all facts that bear upon the subject of future economic progress, and we may frankly and openly admit any truth which concerns the immediate future even though it might, in some respects and to some minds, appear to be unfavorable.

The people of the United States have reason for confidence in the business future. They need not be discouraged nor impatient. They have only to look about them and study the facts and figures.

We have recently had opportunity to read the report of the comptroller of the currency. He informs us that the resources of all the banks of the United States break all records and exceed the combined bank assets of all other leading nations of the world and that they now amount to $53,079,-108,000, not including federal reserve banks! Compare this with the time of Alexander Hamilton, secretary of the treasury of the United States, who wrote under date of Feb. 26, 1793, to the president, directors and company of the Bank of the United States:

"I have to request that you will be pleased to advance to Samuel A. Otis, Esquire, the sum of $15,972.90 on account of the compensations due to the senators of the United States.

"As I have been informed that the bill, making appropriations for the present year, has passed both houses of congress, I hope to have it in my power very shortly to replace this sum, as well as the monies which have been hitherto advanced by you for the public service, in compliance with my several requisitions for that purpose."

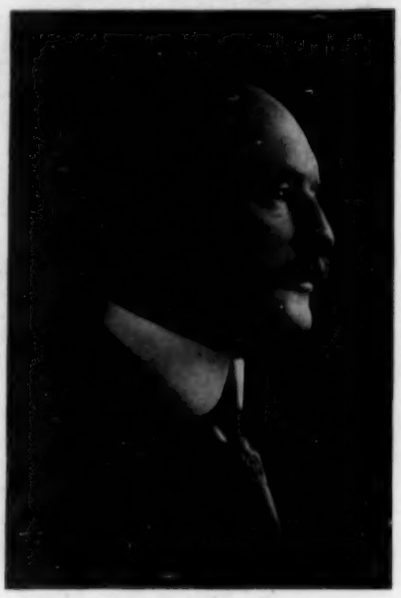
You are familiar with the total wealth of the United States and the value of the yearly production. I have previously referred to them, and made comparisons with other countries. Our people should be thankful but they may not be proud nor indifferent towards others. They have great responsibility. They will size up to it. Occasionally there will be unpleasant vicissitudes. There will be agitators abroad in the land endeavoring to create dissatisfaction and disturbances, sometimes masquerading as reformers. There will be secret enemies of our country; and all right thinking people must be on their guard. Love of country is the rule. Indeed it is the habit.

I think the members of the iron and steel industry of the United States, up to the full limit of propriety, should co-operate with those of other countries. I have information that many foreign manufacturers will be glad to participate with us in another international meeting. In the near future questions pertaining to this subject will be discussed by your board of directors, to whom you have always delegated full authority.

The onward march of progress is moving rapidly. We may and will be a part in the procession and, in a measure, assist in guiding the course. I have heretofore publicly said, quoting from the Bible: "As no man liveth to himself so no nation liveth to itself." This is applicable to the present period.

When we consider the world's disasters, destructions, agitations, distrusts and vicious propaganda, the wonder is that business during the last few years has been so good and our country so prosperous as it has been. Gentlemen, the earth is still regularly turning on its axis, the seasons come and go, the fields laugh with the harvests, the mines and wells yield their riches, the morals of the people in general are improving and an overruling and just Providence is surely controlling the destinies of men and nations.

Diversified Subjects Are Ably Discussed



CHARLES P. PERIN
Consulting Engineer with Perin & Marshall, New York City

WALTHER MATHESIUS, whose paper, "The Blast Furnace Hearth," was presented by him before the institute, is superintendent of blast furnaces at the South Works of the Illinois Steel Co., South Chicago, Ill., the position held by him since 1917. From 1904 to 1906, he was employed in various operating capacities in several blast furnace and steel plants in Germany. In 1906 he attended the Technical University of Berlin, specializing in ferrous metallurgy and obtained a master's degree in 1910. During the year following, Mr. Mathesius served that university as assistant professor obtaining a doctor's degree in 1911 on the basis of his treatise on "Magnetic Properties of Manganese and Nickel Steels." In that year, he came to America and assumed important duties at the research laboratory of the American Steel & Wire Co., Worcester, Mass. From 1912 to 1915, he was employed as assistant superintendent of several blast furnaces at the Illinois Steel Co.'s South Works; in the latter year being promoted to be assistant blast furnace superintendent until 1917.

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ROBERT R. ABBOTT, who went into the details of "Heat Treatment of Automobile Steels," is head of the mechanical laboratory of the Peerless Motor Car Co., Cleveland, and has devoted much of his time and attention to the heat treatment of steels entering into the construction of his company's product.

* * *

CHARLES P. PERIN'S paper on "Recent Developments in the Iron and Steel Industry of India" lost nothing by its presentation by his cousin, F. L. Estep, one of Mr. Perin's chief assistants. Mr. Perin himself is abroad at the present time, the paper having been prepared by him while on his way to investigate the subject of it, so that it incorporates all the latest data regarding India's iron and steel industry. For 17 years, Mr. Perin has been consulting engineer for the Tata Iron & Steel Co., Jamshedpur, India, so that he was able to give his subject authoritative backing. He is one of the leading iron and steel metallurgical engineers of the United States. He was born at West Point, N. Y., in 1861 and was graduated from Harvard university in 1883 and later from the Ecole de Mines in Paris. One of Mr. Perin's first connections was with the Carnegie Steel Co., Braddock, Pa. Later he was identified with the blast furnace plant at Middlesboro, Ky., now owned by the Virginia Iron, Coal & Coke Co., Roanoke, Va. For a while, he served the Embree Iron Co., Embreeville, Tenn., as its president. Mr. Perin built the coal mining plant at Keokee, Va., and served as president of the company which conducted the coal and coke operations at that point, which company later was consolidated with the Stonega Coke & Coal Co.

WALTHER MATHESIUS
Superintendent Blast Furnaces, South Works, Illinois Steel Co South Chicago, Ill.

E. A. WHEATON
Superintendent Open-Hearth Department, Bethlehem Steel Co., Bethlehem, Pa.

* * *

E. A. WHEATON, who presented a paper on "The Use of High Manganese Iron in Basic Open-Hearth Practice," has risen high in his chosen vocation in the comparatively few years he has devoted to it. He was born in 1889 and was graduated in 1912 from Lehigh university, South Bethlehem, Pa., with the degree of metallurgical engineer. He became associated with the Bethlehem Steel Co., in that year in its chemical laboratory at South Bethlehem, Pa. He was transferred to open-hearth furnace No. 1 during the early part of 1913 and shortly after became assistant superintendent. In December of 1915, he again was transferred and was made assistant superintendent of No. 3 open-hearth furnace and in 1917 was appointed superintendent of that department, which position he now holds.

Before American Iron and Steel Institute

ALEXANDER H. HOLLIDAY
Manager of Exports, the Jones & Laughlin Steel Co., Pittsburgh

ALEXANDER H. HOLLIDAY doubtless was selected by the American Iron and Steel institute's program committee to discuss "Foreign Trade" because of his wide experience along those lines. He is manager of exports for the Jones & Laughlin Steel Co., Pittsburgh, and has been identified with the steel industry for about 23 years. He was born in Brookville, Pa., and was a member of the class of 1887 of the University of Pennsylvania. His first connection with the iron and steel industry was as claim adjuster for the Park Steel Co., Pittsburgh, now a unit of the Crucible Steel Co. of America, where he remained for three years. He became affiliated with the Jones & Laughlin Steel Co. 20 years ago and served for 14 years of that time as special agent in charge of claim adjustments. When the export department was organized on July 15, 1915, Mr. Holliday was placed in charge as manager and since that time, he has occupied that position.

* * *

F. L. TOY, who handled his subject "The Basic Open-Hearth Process" in an able manner, is superintendent of the open-hearth departments of the Carnegie Steel Co., with headquarters at Munhall, Pa., and has had considerable other open-hearth experience. He was graduated in metallurgy from Lehigh university, in 1909 and was employed on an electric furnace in the open-hearth department of the Homestead steel works for two years following his graduation. From 1911 to 1916, he was assistant chief metallurgist at that plant and in that year was advanced to be superintendent of open-hearth departments Nos. 1 and 2 as well as superintendent of the foundry, which position he held for about three years. Last year he was promoted to his present position.

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GEORGE OTIS SMITH, whose timely paper "Thrift in Coal," brought before the members of the institute the necessity for conservation of the nation's fuel supply, has the distinction of being the only speaker to be heard twice by this organization in the past year. He delivered an address on "Industry's Need of Oil" before the spring meeting, held May 28, 1920. He also has written many articles on geology in the United States which have received widespread circulation. He was born in Hodgdon, Me., Feb. 22, 1871, and was graduated from Colby college with the degree of bachelor of arts in 1893. He has held his present position since 1907, having been geologist for the survey since 1896.

GEORGE OTIS SMITH
Director, United States Geological Survey, Washington

DANIEL M. BUCK
Metallurgical Engineer, American Sheet & Tin Plate Co., Pittsburgh

* * *

DANIEL MOYER BUCK made another appearance before the institute and presented "A Review of the Development of Copper Steel." Many will remember that Mr. Buck discussed in an able manner "Recent Progress in Corrosion Resistance" at the eighth general meeting of the institute, held May 28, 1915. He is metallurgical engineer of the American Sheet & Tin Plate Co., Pittsburgh, becoming affiliated with that company in 1903. Prior to that, he had been assistant chemist for the Crucible Steel Co., from 1901 to 1903 and in the latter year assumed the duties of chief chemist for the American Sheet & Tin Plate Co. Mr. Buck was born in Greenville, Pa., Aug. 16, 1877, and was graduated from Thiel college in that city in 1897. He then removed to Cleveland to attend Case School of Applied Science and was graduated from it in 1900. The year following he was employed as assistant chemist by the Crucible Steel Co., since which time his advancement has been rapid. Mr. Buck is a member of the American Chemical society, the American Society for Testing Materials and the International Association for Testing Materials.

Manganese Iron as Desulphurizer

Tests Indicate that Use of High Manganese Pig Iron Enables Open-Hearth Operators To Maintain Low Sulphur Content in Basic Steel—Practice Does Not Reduce Tonnage

BY E. A. WHEATON

STEEL producers of the United States are face to face with a growing scarcity of low sulphur fuels. Many steel users are prone to attribute to sulphur in steel, most of the failures experienced in service; and many manufacturers believe that the sulphur limits now current in the various specifications for steel, represent limits which cannot be exceeded without a distinct loss of tonnage in forged and rolled products due to the "red shortness" classically attributed to sulphur content. This loss of tonnage is as intimately a concern of the consumer as of the producer.

A very important consideration, therefore, for all factors, is the problem of avoiding future increases in steel sulphurs in the face of certain future increases in fuel sulphurs.

The purpose of this paper is to show one of the phases of the experimental activities of the Bethlehem Steel Co. in attempting to solve this important problem; and the particular phase dealt with herein, is the partial elimination of sulphur from high sulphur pig irons by the use of a manganiferous burden in the blast furnaces to produce pig iron for use in basic open-hearth furnaces which shall contain enough manganese to considerably desulphurize the pig iron in the ladle, the mixer and the furnace bath. Some data will also be presented tending to show the deoxidization of the open-hearth bath contemporaneously with desulphurization.

In the face of increased difficulties in obtaining high grade raw materials and in the effort to produce the highest quality of products requiring special inspection and for special service, and believing that certainly some of the difficulties might be overcome by the use of a high manganese pig iron, the Bethlehem plant of the Bethlehem Steel Co. undertook to operate its No. 3 open-hearth furnace for a considerable period of time in the manufacture of steels where the inspection and service was particularly severe and where the effect of any improvement of quality would be most readily demonstrated. The data presented herewith extends over several months' experience but particularly refers to the month of August, 1920, as nothing but high manganese pig iron was used at that time.

From the date presented herewith the writer has drawn the following conclusions:

First.—That high manganese iron is a help rather than a hindrance in blast furnace practice.

Second.—That high manganese iron improves the quality of open-hearth steel without reduction of tonnage or practice or other injurious effects.

Third.—That to meet the demands for the better grades of steels, alloy, etc., it is of very great assistance.

Fourth.—That, due to better surface conditions, steel made from it shows increased yields with ordinary rolling mill practice.

With high sulphur coke and inferior raw materials, a blast furnace must resort to a very limey slag or increased slag volume in order to insure low sulphur steelmaking iron. Either means low tonnage in blast furnace and high coke ratio. If the manganese in the hot metal is kept around 2 per cent, it is possible for the blast furnace man to run his iron higher in sulphur with leaner slags, increased tonnage, and reduced fuel ratio; and at the same time deliver to the open hearth, iron as low in sulphur as could be obtained with low manganese iron cast much lower in sulphur. This is borne out by the following data of 136 tests run on high manganese irons between blast furnaces and open-hearth furnace No. 3 at Bethlehem, to determine the desulphurization which occurred in the pig iron transfer ladle.

The methods used were as follows: *C* blast furnace was run on high manganese iron with lean slags and, of course, high sulphur. A sample of this metal was taken from each ladle at the blast furnace and from the same ladle at the open-hearth mixer. The average time between sampling at the blast furnace and the mixer was 80 minutes which is about the average time consumed in normal operation. One hundred and thirty-six ladles of iron were thus tested. These ladles contained varied percentages of manganese and sulphur which have been divided into three groups according to manganese content, as follows:

First group, iron from 1 to 1.50 per cent manganese.

Second group, iron from 1.50 to 2 per cent manganese.

Third group, iron from 2 per cent and above, manganese.

Table I

Tests on Desulphurization

No. of tests	Per cent manganese in iron	Average: Sulphur at blast furnace	Average: Manganese	Average: Sulphur at open-hearth mixer
21	1.0 to 1.50	.0867	1.39	.041
89	1.50 to 2.0	.070	1.72	.035
26	2.0 and above	.073	2.13	.031

From the tests, the averages of which are shown in Table I, it would seem, at first glance, that an average of 1.39 per cent manganese is as effective as higher manganese for desulphurization in the ladle. However, the pig iron sulphurs in the entire 21 heats of the first group, were relatively high, thus affording better opportunity for reduction of sulphur than was afforded in a number of casts in the second and third groups.

We found, also, that with iron running less than 1.80 per cent manganese, it was necessary to hold longer in the ladle than with manganese over 1.80 per cent.

The silicon on this iron averaged 1.15 per cent. I believe that this should be below 1 per cent since I have assumed that with normal temperatures the elimination of sulphur from pig iron in the ladle takes place under following reaction:

Slag formed on ladles is properly $MnOSiO_2$ (manganese silicate). Any excess of SiO_2 forms $FeOSiO_2$ (iron silicate). Manganese in connection with sulphur forms MnS which with low SiO_2 is broken up to Mn and SO_2,

From a paper presented at the New York meeting of the American Iron and Steel Institute, Oct. 22. The author, E. A. Wheaton, is superintendent, open-hearth plant No. 3, Bethlehem Steel Co., Bethlehem, Pa.

Mn going back into the metal, and the SO_2 goes into the air.

With excess SiO_2 we have $FeOSiO_2$ present, $MnS + FeOSiO_2 = FeS + MnOSiO$. *FeS* goes back into the metal and no reduction of sulphur takes place. In this test, dolomite was used in the runner at the blast furnace, in the place of sand, in order to keep the slag as low as possible in SiO_2.

With high manganese iron, elimination of sulphur also takes place in the mixer, if the SiO_2 is kept low in the slag; with a ratio $\frac{SiO_2}{MnO} = 0.80$ in slag, greatest removal was accomplished, but some removal takes place with $\frac{MnO}{SiO_2} =$ as high as 1.20. In these tests the average removal of sulphur in the mixer was 0.006 per cent.

The general conclusions drawn from the above data are, that it is possible for the blast furnace man with high manganese iron, to run lean slags, maintain tonnage, and with sulphur in blast furnace iron as high as 0.100, to deliver that same iron to the open-hearth furnaces through mixer, with 50 per cent of sulphur eliminated.

Table II

Effect of Manganese on Desulphurization

Manganese in pig iron	Residual manganese	Manganese added	Manganese obtained	Gain	Loss	Sulphur Obtained	No. of heats
.75-1.00	.15	.37	.47	.62	.07	.046	40
1.00-1.50	.22	.23	.44	.033	.044	.043	40
1.50-2.00	.26	.20	.45	.023	.044	.041	40
Above 2.00	.58	15	.48	.02	.045	.038	40

Operating Open-Hearth Furnace

The principal objections brought out against the use of high manganese iron are decreased tonnage, decreased yield of ingots, scorification of furnace banks and scorification of ladle linings, causing decreased life of ladles. I will give the results of our experience at open-hearth furnace No. 3 at Bethlehem in this connection.

During the month of August, 1920, we worked exclusively on high manganese iron. We have 50-ton furnaces and tapped 70-ton heats of ingots. The average time of heats during this month was 10 hours and 15 minutes. This includes all the alloy grades, and is the best average time that was ever made in this shop. One of the reasons of this decrease in time of heats was the fact that a slag can be worked into shape quicker with high manganese iron than with low manganese.

Yields at open-hearth furnace No. 3 for the month of August, 1920, according to grades, are as follows:

	Per cent
Basic carbon high manganese	69.77
Basic carbon ordinary	90.29
Basic carbon special	89.47
Basic carbon high silicon	90.45
Basic nickel	88.38
Basic chrome	91.18
Basic nickel chrome	89.89
Basic chrome vanadium	91.64
Basic chrome molybdenum	90.22

This is better practice than the average with low manganese iron, which is partially explained as follows. The average analysis of the iron is manganese, 2.10; phosphorus, 0.029; sulphur, 0.051; and silicon, 1.18 per cent, which with the scrap charge would give a charge of about 1.40 per cent manganese. The residual manganese in the bath averaged 0.34 per cent or a loss in manganese of 1.04 per cent of the weight of the charge.

Our experience with low manganese iron, running about 0.705 per cent manganese, would be a charge containing about 0.60 per cent manganese, a residual of 0.10 per cent manganese, or a loss of 0.50 per cent manganese. Therefore, the difference in manganese loss of a high manganese charge over a low manganese charge would be 1.04 per cent less 0.50 per cent or 0.54 per cent of the weight of the charge in favor of low manganese iron.

The slag weight runs about 250 pounds slag per ton of charge. With normal slag on low manganese iron, this slag contains about 16 per cent of *FeO* or 12.4 per cent *Fe*, which is 1.34 per cent of the metallic charge.

The slag on high manganese iron charges, as will be shown later, shows an average of 9 per cent *FeO* or 7 per cent *Fe* which is 0.69 per cent of the metallic weight of charge. This gives the *FeO* loss in slag 0.69 per cent on high manganese iron against 1.34 per cent low manganese iron or a saving of 0.65 per cent of iron, which more than equalizes the 0.54 per cent loss in manganese due to the use of high manganese iron.

Scorification of Furnace Bottoms

I can find no explanation as to why high manganese iron should be harder on furnace bottoms than low manganese iron. During this same month of August, we averaged 11 minutes bottom delay per heat which is lower than usual. *MnO* being a base should not affect a basic bottom.

The experience with ladle linings shows nothing detrimental in the use of high manganese iron. The average for the month of August, of 18 heats per ladle, compares favorably with ordinary practice. We used a 90-ton ladle for a 70-ton heat, giving a large volume of slag; with slow pouring through 1½-inch nozzles. Also, we box-pour, which necessitates hot steel and slag.

Effect on Quality of Steel

While there is considerable conjecture as to the injurious effects of sulphur in the finished product, every one will agree that both sulphur and oxygen are the cause of considerable worry to those whose task it is to convert the ingot to the finished product. Iron combines easily with sulphur and in certain associations at certain temperatures is capable of taking it up from otherwise stable compounds. Among others, it decomposes sulphate of lime ($CaSO_4$) according to the equation:

$$CaSO_4 + 4Fe = FeS + CaO + 3FeO.$$

The iron sulphide goes into the metal. From this it is seen that even though we start with a low sulphur charge and are compelled to use high sulphur fuel, the sulphur may get into the bath in the following manner:

All producer gas contains variable percentages of sulphur, some of which is in the form of sulphurous acid, which in the flame comes into intimate contact with the charge.

In the combustion chamber a portion of the sulphurous acid is oxidized to sulphuric acid which combines with lime to form lime sulphate. The latter can be reduced by the iron whereby the sulphur goes into the metal. When the charge in the open-hearth furnace contains a sufficient amount of manganese there is an opposite reaction. Manganese forms with sulphur *MnS* which is soluble in the slag as well as in the metal. *MnS* has the further property, in contact with free oxygen, of giving off SO_2 which escapes from the furnace, with the waste gases, and the slag is robbed of its sulphur content. The data in Table II shows how, with the different residual manganese in metal, the different degrees of desulphurization take place.

The sulphur in the charge was increased with the manganese in the iron rather than decreased:

Charge of 0.75 to 1 per cent manganese averaged 0.052 per cent sulphur.

Charge of 1 to 1.50 per cent manganese averaged 0.053 per cent sulphur.

Charge of 1.50 to 2 per cent manganese averaged 0.055 per cent sulphur.

Charge of 2 per cent and above man-

ganese averaged 0.061 per cent sulphur. The same fuel was used on all heats.

An interesting experiment was conducted in Bethlehem two weeks ago in connection with the removal of sulphur by means of manganese. Cast A2332, analyzing at the blast furnace manganese, 1.92; phosphorus, 0.120; sulphur, 0.228; and silicon, 0.65, was used directly on heats B55676 and C52237; the residual manganese in these heats was 0.31 and 0.33 per cent respectively; the sulphurs on the finished heats were 0.029 and 0.030 per cent. At the same time cast B4004 analyzing manganese, 0.90; phosphorus, 0.98; sulphur, 0.120; and silicon, 0.68, was used on heat B55688 and the finished sulphur showed 0.077 per cent. All three heats were worked as nearly alike as possible in the furnace, using the same kind of fuel, scrap, limestone, charge, etc. No time was lost working down sulphur in either case.

From the above results it is concluded that manganese introduced in the pig iron will reduce sulphur in the open-hearth charge.

Oxygen in Steel

According to the best evidence, the first indication of red-shortness in steel is noticeable with 0.01 per cent oxygen, while a content of 0.05 per cent oxygen renders steel unusable. According to Dickman, red-shortness due to oxygen cannot be offset by carbon, phosphorus or silicon, but can be very much reduced by means of manganese, which, although it does not effect complete removal, must be regarded as the best destructive agent of the ferrous oxide dissolved in the iron. We can then use manganese as a preventive agent against red-shortness by means of additions to the charge. This is best accomplished by the use of high manganese iron.

Dickman also claims, and this is borne out by our practice, that oxygen will not be found in steel in noteworthy quantities so long as the residual manganese remains sufficiently high (0.30 per cent).

The phenomenon of the return of manganese from slag to metal is shown by a number of tests made at Bethlehem. These tests were taken from different heats at one-half hour intervals and show, in most cases, the return of manganese from slag to metal.

In acid steel manufacture, a great deal has been said in the past few years about the impregnation of the bath with silicon from the slag and furnace bottom; and I think it has been generally agreed that an acid heat, to impregnate any large amount of silicon (say about 0.18 per cent) must be pretty free from oxides. The same may be said about reversal of manganese from slag to metal in a basic furnace; when this takes place, the heat must be pretty well cleared up and the slag and metal must be nearly free from *FeO*.

Slag analyses were taken from heat B55699 at the same time as the tests for residual manganese, with the following results:

The residual manganese in the first test was 0.20 per cent, and in the second test (½ hour later) it was 0.32 per cent. The slag analysis was:

	First test	Second test
SiO_2	22.15	24.93
CaO	48.28	48.81
MgO	5.32	7.70
FeO	10.55	7.09
MnO	5.65	3.95
P_2O_5	1.43	1.45
S	0.255	0.125

The decrease in *MnO* shows a return of manganese to metal from slag; a corresponding decrease of *FeO;* also a decrease of sulphur in slag due to the *MnS* being broken up and the *Mn* returning to the metal. With iron oxides as low as this in basic open-hearth slag, we would not expect much oxygen to be found in the steel.

The advantage of having the manganese in the charge and not adding it preliminary to the tapping of the heat is best brought out in an article written by Mr. Kinney, which appeared in the *Transactions* of the Institute of Mining and Metallurgical Engineers of April, 1919. Mr. Kinney asks the question, "Can one logically assume that the demand for thorough deoxidization be met when a bath of steel low in residual manganese, and covered with a basic slag containing the general percentages of oxides, be deoxidized by the most archaic method of adding a few hundred pounds of deoxidizer in the ladle and pouring the steel almost immediately?" Also, is it possible for equilibrium to be attained in slag and metal and complete deoxidization when this manganese is put in the furnace just previous to tapping?

Upon the answer of these two questions depends the need of a high manganese charge for the manufacture of the better grades of basic open-hearth steel. Previous data show that the loss of manganese from additions made at tapping is very greatly reduced as the residual manganese of the heat increases. During the past month steel has been made at open-hearth furnace No. 3 with an average residual manganese of 0.38, adding 0.13 and finishing 0.48 or a loss of 0.03 points. This shows clean steel.

Steel made from high manganese iron shows considerably less tearing at the bloomer, requiring about one-third less chipping; yielding, by my estimate, more than 3 per cent additional good product.

Columbia To Train Men To Head Organizations

Due to the growing demand for men in executive positions, not only well trained in problems of finance, commerce and labor, but also well grounded in the technology of manufacturing processes, Columbia university has established courses of instruction in industrial engineering to train men to head great enterprises in various fields. Walter Rautenstrauch, professor of mechanical engineering at Columbia and vice president of the J. G. White Management Corp., in charge of all industrial properties operated by that corporation, recently said:

"Successful organization links harmony of effort with superior processes of production, appropriate adjustment of fixed and operating charges to meet competition, and the general fundamentals of sound business. These elements should be associated, and while diligent care should be given to the technical and business problems of an enterprise, the importance of the human factor should be stressed. Insurance against depreciation of methods of operation and disintegration of organization is vital to a progressive manufacturing policy.

"Many industrial plants have outgrown their locations or are forced to reorganize. Extensions to plants offer opportunities for revision of layout to obtain more economical methods of handling and manufacturing. At no period have accurate and timely reports on cost of manufacture and operation been so important as now. The wide scale of price variations in materials and labor and the varying influences tending to reduce output have given rise to conditions making correct methods and authoritative reports on leading items of cost and their relation to selling prices imperative to the manufacturer.

"Within the last few years there have been a great many schemes advanced under the heading of industrial democracy, welfare work, and employment management. While attention will be given to the influence of these movements, care will be taken to point out that no plan, however high sounding, can ever take the place of the human basis, upon which industrial enterprises must be successfully managed. If the spirit existing between the management and the men is not properly founded, no scheme or method can overcome this defect. The manager must be intensely human, but at the same time he must have real business sense, since all industrial relationships which are permanent and endure must rest on a sound economic foundation.

"One of the great needs in industry today is the development of manpower through the establishment of those conditions of operation which promote the building of character in the men. It is therefore incumbent on the management to know what is a fair return in work for wages paid and to make these conditions known to the workmen."

Making Basic Open-Hearth Steel-I

Improved Devices and Methods for Preserving and Lengthening the Life of the Furnace Have Been Developed—Merits of Various Fuels for Melting the Charge Are Discussed—Efficiency of Furnaces

BY F. L. TOY

THE experiments of William and Frederick Siemens in England, 1857 to 1861, developed what was absolutely essential to the success of the open-hearth furnace as an agent in steelmaking, gasification of the fuel in combination with a new regenerative principle applied to the heating of the gas and air for combustion. In the period 1863-67, William Siemens and the Martin brothers of Sireuil, France, had developed the pig and scrap method successfully; by 1868 William Siemens had made successful as a commercial process the pig and ore process. In 1879 the Thomas-Gilchrist or basic process as applied to the bessemer converter was demonstrated as a commercial success at Middlesborough, England, and its application to the bessemer and open-hearth processes spread rapidly, particularly on the continent, to make available the large deposits of high phosphorus ore.

Samuel T. Wellman in 1869 built the first successful open-hearth furnace in this country at the Bay State Iron Works, South Boston. Its capacity was 5 to 6 tons and melted of course on an acid bottom.

Mr. Wellman and George W. Goetz, both of the Otis Steel Co. at that time, after study of the basic open-hearth process in Europe, made steel on a basic bottom at the Otis Steel Co.'s plant, Cleveland for about four months when the experiment was discontinued. The manufacture of basic open-hearth steel as a commercial product dates from March 28, 1888, when first produced at the Homestead works of Carnegie, Phipps & Co. Notwithstanding considerable difficulties in operation, mainly due to the dolomite and tar bottom, basic steel was continuously made at this plant with such success that during 1889 the construction of additional basic furnaces of the Lash type was commenced. By the close of 1890, 16 basic open-hearth furnaces were in operatoin at these works.

After many discussions by the Carnegie Steel Co.'s open-hearth committee along the lines of present developments in basic open-hearth plant and furnace design, the following figures and characteristics show in part what might be considered the best practice at the present time.

FUEL: Producer gas.
CAPACITY. 100 tons.
DISTANCE BETWEEN LEVELS: 20 feet.
FURNACE BOTTOM: Pan type with 12 inches of sintered magnesite on 12 inches of magnesite brick on 24 inches of fire brick.
AREA OF BATH AT SLAG LINE: 6.5 square feet per ton of steel capacity.
DISTANCE CENTER TO CENTER OF FURNACE: 90 feet.
HEIGHT FROM DOOR SILL TO SKEWBACK OF ROOF: 60 inches.
ROOF: Roof body should be straight, arched in one direction with 24 inches spring. Roof thickness, 12 inches. Only standard shapes used.
DOORS AND FRAMES: Water cooled. Doors electrically operated.
BUCKSTAYS: Slab type, water cooled.
FRONT AND BACK WALLS: Should be supported on water coolers at or near the slag line.
PORTS: Semiwater cooled type, cooled at vital points.
BULKHEADS: Water cooled.
AIR REGENERATORS: A minimum capacity of 68 cubic feet per ton of steel and a minimum heating surface of 150 square feet per ton. These figures for one regenerator.
GAS REGENERATORS: A minimum capacity of 46 cubic feet and a minimum heating surface of 100 square feet. These figures for one regenerator.
VALVES: Area of gas and air valves 10 square feet each.
DAMPER: Cast iron, inclined and air cooled.
PRODUCERS: Mechanically operated—two per furnace. Each producer with capacity for gasifying 60,000 pounds per day.
STACK: 180 feet high 6 feet inside diameter.
WASTE HEAT BOILERS: Yes.
METAL MIXER: Unit size, 500 tons capacity. Elliptical shape. Fire brick lining.
GENERAL: Stock yard to be roofed. Ore, limestone, and spar to be kept in bins constructed so as to provide for easy unloading and loading, with no shoveling. Best labor saving devices to be used in repairing furnace and regenerators.

Producer gas has been throughout the development of the open-hearth process, acid and basic, the mainstay as a fuel; furnace development as to the size and output has been paralleled and assisted by development in capacity and efficiency of the gas producer. The present trend is to fewer and larger units per furnace, as for example, a 100-ton furnace can be satisfactorily taken care of by two large producers, each with a capacity of gasifying 60,000 pounds of coal per day.

Mechanical feeding, poking, ash handling, careful crushing and screening of coal, careful regulation of blowing have helped to decreasing costs of operation. The advantages of the producer are its simplicity and fairly low cost, its limitations are due to the high noncombustible content of the gas with the corresponding low calorific power and the objectionable clogging content of soot and tar. The necessary preheating of gas to obtain adequate flame temperature makes for larger generative systems and more complicated and costly furnaces. The proportion of total fuel gas generated in the producer in the future depends altogether on the growth of the by-product coke industry.

By-product coke-oven gas has developed as a fuel for the open-hearth furnace in the United States within the last five years. Considerable work has been done with it in Europe, particularly through mixtures of blast furnace and producer gas with it. As commonly used it is debenzolated, so that it is somewhat less luminous than the raw gas with from 5 to 6 per cent less of heating value. Having a calorific value of half that of natural gas, it possesses nevertheless, at least three times that of producer gas, is much cleaner, has a low content of inert gases.

For considerable periods during the last 18 months practically straight coke-oven gas has been burned at the No. 3 open-hearth plant at the Homestead works of the Carnegie Steel Co. with but small loss of tonnage as compared with natural gas, through the same burners and without use of tar. The greater cost of furnace repairs although small would warrant however a study of the situation with the object of shorter flames, better flame control and an earlier ignition. The Duquesne works also has had a period of successful use in a producer gas type of furnace as compared to their producer gas practice. In both cases the gas enters at right angles to the air. The problem of burning coke-oven gas seems to be in the early stages of solution and promising as it looks at present as a fuel, there can be undoubtedly much greater efficiency in burning, with incidental attainment of higher flame temperatures with the flame placed and kept where it will give maximum effect.

The quantity of tar produced in the by-product oven bears a fairly close relation to the volume of gas produced and the question of its overproduction in the growing scale of magnitude of by-product coke operations may arise. The excellence of

Abstract of a paper presented at the Oct. 22 meeting of the American Iron and Steel Institute, New York. The author, F. L. Toy, is superintendent of open hearths, Homestead works, Carnegie Steel Co., Munhall, Pa.

tar as a fuel not only in the open-hearth furnace but also in heating furnaces and under boilers makes the possibility of its over production remote. The present surplus over the needs of the tar refiners is used as before stated in combination with coke-oven gas or, as in several plants, is used alone as a fuel in a manner similar to that for fuel oil, employing air or steam, particularly the latter, to atomize the tar and convey it into the furnaces. The burners usually are placed in the end walls following the

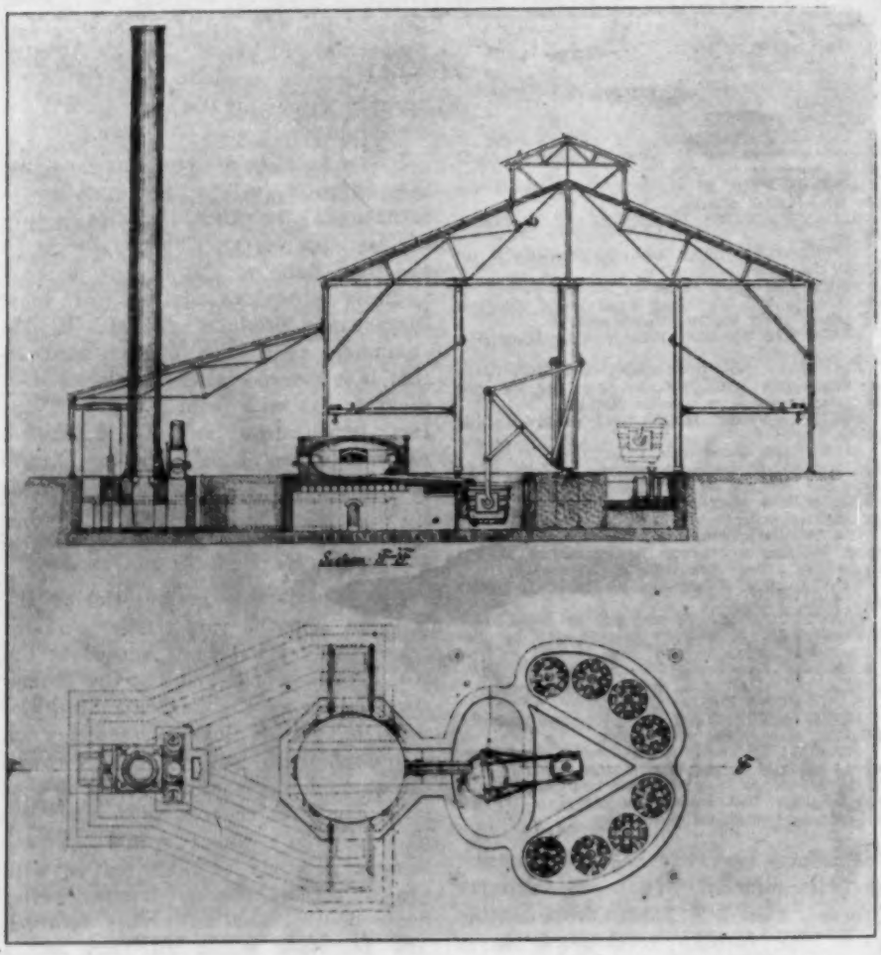

FIG. 1—LASH TYPE OF OPEN-HEARTH FURNACE WHICH WAS FIRST USED COMMERCIALLY AT THE HOMESTEAD WORKS FOR THE PRODUCTION OF BASIC OPEN-HEARTH STEEL. THE FURNACE WAS EQUIPPED WITH HORIZONTAL FLUE CHECKERS

system used for oil. Great care must be taken to maintain sufficiently high temperatures by means of steam coils in storage tanks and supply lines, to avoid the deposition of pitch-like material which quickly clogs up the supply system.

Fuel oil in its various stages from crude oil to residues dates back in its use as open-hearth furnace fuel to the introduction of the basic process into this country. It is a most convenient fuel, particularly for small plants. Its high flame temperature and easy control makes it suitable for fine steels or work in foundries where high-tapping temperatures are necessitated by numerous shutoffs in pouring and thin intricate castings. Of late the quality and amount of fuel oil passed over for fuel uses in metallurgical industries by the refiner and the high sulphur content of many of the oils has made the use of oil both expensive and troublesome. It cannot rank as a major fuel and its supply is doubtful for steel making.

Powdered coal has been used in a number of open-hearth plants continuously as a fuel for a number of years and has had extensive application for short periods in others where acute shortages of natural gas and lack of space for gas producers made the powdered coal fuel appear as the best relief. Powdered coal, even so fine as to pass almost entirely through a 300 mesh sieve, burns slowly as compared to gases. The extremely high velocities of injection into the furnace used in the past have prevented economical burning and have tended much towards the burning out of the brickwork on the outgoing ends. Lower velocities of introduction, volume air systems and use of primary air have given the fuel a much better chance to burn efficiently in the furnace. Preheating the air for combustion adds greatly to furnace efficiency and speed.

Admitted that the powdered coal burning is of late showing much more promise, the problem of the ash, which greatly complicates the regenerating system and interrupts the furnace operation, must be solved. Powdered coal systems must in the future take their share of high ash, high sulphur coals as must the gas producer. The cost of pulverized coal at the furnace is cheaper than that of producer gas for equal prices of coal. Steel has not been made with powdered coal fuel as cheaply as by average producer practice. Powdered coal is still in a stage of evolution, and gives promise of replacing gaseous fuels in many processes.

Natural gas, associated so prominently with the first stages of the basic open-hearth process in this country, is the finest fuel as yet obtainable for the purpose of steel-making. The next two years will no doubt find its use restricted to the domestic consumer with a growing demand for coke-oven gas by the cities and towns.

Reliable investigations made at the Homestead works and at a recent meeting of the American Iron and Steel institute by William Whigham, show that of the total heat available in the open-hearth furnace, 14.16 per cent is in the steel at tapping, 3.3 per cent in the slag, while 2.78 per cent is used in reduction of ore and calcination of limestone. Of 62.45 per cent of the heat leaving the outgoing port to enter the checker chambers, 22.93 per cent is absorbed by the checkers, 4.53 per cent is absorbed between the checkers and stack, and 34.99 per cent is carried up the stack. Radiation and conduction losses would total 17.31 per cent.

The thermal efficiency of the regenerators, based on the ration of the heat given up to the air and gas as against the total heat return to the regenerators ranges from 20 to 38 per cent. The first consideration must be to get a greater return from the heat passed onto each unit of the furnace. The burning of the fuel so as to melt the charge more readily, to promote heat transfer to the steel and slag, and with complete combustion over the hearth, must be the first and most important achievements.

In comparing and reviewing gas burning systems, that condition which stands out most is the fact that our ports are a compromise to suit both conditions of entry and exit. The tendency, therefore, is almost universally to make the area of the ports too large for the incoming air and too small for the outgoing products; also, in producer gas

furnaces, for gas velocity to greatly exceed the air velocity through its port, a condition bad for rapid combustion and high flame temperatures. Our flames are usually too long and start too far from the entering port.

In furnaces of present design the mixing of air and gas depends on the inclination of the air to gas port, and the extension of the air port beyond gas port to give the air access to the gas before entering the furnace chamber. It has been thought necessary to provide a heavy air blanket above the gas, so that the gas, being lighter than the air, would at least burn before it rose to a point where its combustion would damage the roof. Much better is a mixing of air and gas in the port so that combustion will start and finish while the flame still has direction along the top of the hearth. The products can then rise and fill the furnace chamber, giving their heat to the bath and brickwork without damage to the latter, provided there is sufficient port area on the outgoing end.

Another condition, as yet hardly appreciated, shows flames approaching too closely the outgoing end, thus indicating incomplete combustion. We have taken many stack samples, found excess oxygen and no carbon monoxide and have concluded that combustion in the hearth chamber was completed. Careful sampling and analysis of gases from outgoing ports at several of the Carnegie Steel Co.'s plants, lead to the conclusion that condition of incomplete combustion may exist at the outgoing port, whereas the stack sample may show complete combustion due to the completion with excess air provided by leakage into the regenerator chambers, flues and valves. If we have had an excess of oxygen as so frequently stated it has been applied in the wrong place.

The first step toward the efficient use of fuel is to give the flame direction and this depends on the slope of the port roof, the size of the port opening and the velocities of the air and gas. The next step is to supply the necessary oxygen in such manner as to provide a thorough mixture and produce a short, hot flame. Air supplied under forced draft in combination with a system of contrasting the incoming port area while at the same time enlarging the outgoing port area and vice versa on reversal of flow, helps greatly in providing the above desirable conditions and would allow the admission of air directly into the gast port as with natural gas burning. Such relations were illustrated in principle in 1912 by C. A. McCollum, of the Homestead works, and stated by him, in a report covering the efficiency of a furnace, as necessary with forced draft and desirable under all conditions at the furnace. The visible evidences of the embodiment of the above principles will be a shorter and hotter flame, quicker melting, more easy heating of slag and steel, less temperature variation in the bath at the ends from one reversal to another, and finally a much longer life of furnace brickwork. To those who fear that conditions which so help combustion may make for over-oxidation in producing fine steels, it may be said that conditions of good flame control, coupled with better combustion will make finally for more certain furnace control in obtaining either an oxidizing or reducing condition as desired.

More volume is necessary for regeneration than usually is given, due to the cramped space allowed for the re-regenerators. By deepening the chambers and using a chamber more nearly vertical in action, twice the number of chambers could be built on the same area of ground space, thus affording two extra chambers at each end for use in the system as the chambers in use clog up. By placing vertical regenerators of much greater height near the stack greater efficiency and longer service could be obtained, and at the same time plenty of chance for deposition of dust in the flues. Much of the hard drudgery of cleaning out and relaying regenerator brick can be saved by future planning and construction and at the same time a greater return of heat units from the furnace obtained with all the advantages of greater preheat in gaining fuel economy. The advantages of being able to put into service clean chambers as the ones in service choke up, irrespective of time of furnace repair, and those of having regenerative systems that are in good condition over many furnace runs are certainly worth trying for.

The use of thick walls and roofs is open to the objection of excessive melting action on the brick due to the greater amount of heat retained; and to the increased accumulations that result. There has been determined by practice in many cases a maximum thickness of brickwork, for which the radiation losses are balanced by the beneficial effects of cooling in preserving the brick. To suit such conditions there is necessity for development along the line of increased refractory quality in the brick, together with better insulating qualities in cutting down the amount of heat transmitted.

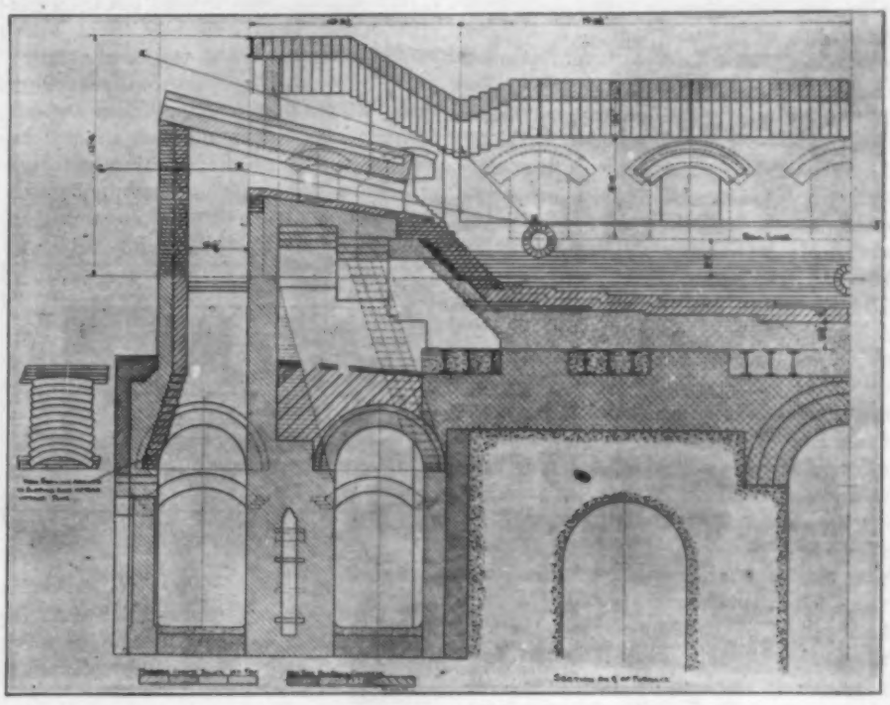

FIG. 2—DESIGN OF ONE OF THE MOST MODERN PRODUCER GAS FURNACES OF 90 TONS CAPACITY. OTHER FURNACES OF SIMILAR DESIGN HAVING CAPACITIES UP TO 110 TONS ARE IN OPERATION

Allowing for all of the improvements made in mechanical equipment for handling both charge and product, for all those made in furnace design and structures, we have still serious problems in furnace efficiency and also in the application of improved furnace design and labor saving methods to the problem of eliminating manual labor. The latter object must be obtained not only by making the final furnace repair less difficult but also by means taken to prevent "choking" up the furnace run and to obtain less frequent repairs while maintaining furnace efficiency. To these problems the open-hearth man, the engineer and manager should give serious attention.

Heat Treating Automobile Steels

Failure of Car Parts in the Majority of Cases Is Attributable to Improper Heat Treating Rather Than to Chemical Composition—Steel Treating Rapidly Being Reduced to an Exact Science

BY R. R. ABBOTT

USE of alloy steels has developed coincidentally with the development of the automobile, and of necessity, the art of heat treating has been extended to keep pace with this development. During the last 15 years in the accumulation of knowledge of the manufacture and heat treatment of special steels, two facts stand out forcibly: (1) Manufacturers have produced comparatively few classes of alloy steels which apparently cannot be improved upon radically by varying the percentage of the constituent elements. No new alloy steels which are radically superior to the steels in use for the last 15 years have been produced recently. (2) Metallurgists are spending immense sums of money in laboratory equipment and experiments to obtain from these steels the highest physical properties possible. In short, the manufacturing foundation is established more firmly than that of the heat treating.

The demand for heat treatment of steel has been developed so rapidly that the supply of men with the practical experience and the fundamental knowledge of the underlying theories necessary for this work, has not been available. The result has been that men not fully equipped with this experience and knowledge have been compelled to assume charge of metallurgical laboratories and heat treating operations and to produce physical properties in steel as demanded by the particular product made.

Steel Treating Theory Simple

The underlying principles of the heat treatment of steel in general are comparatively simple and easily understood but their practical application is not so readily carried out. For example, we know that a piece of medium carbon steel has two critical points or temperatures at which certain physical changes important in its heat treatment take place. These critical temperatures are readily determined by simple laboratory methods, but after this our theory fails to explain the connection between these temperatures and the best quenching temperature to produce certain physical results.

We know that the critical temperatures depend upon the chemical composition of the steel; some elements raise and others lower both, while still others have opposite effect upon each of them. So far, our theory gives us no information regarding these effects, but with sufficient experimental data on hand we should be able to calculate the position of these critical temperatures from the chemical composition of the steel. This has been done and several laboratories obtain all their critical temperatures by calculation from the chemical analysis.

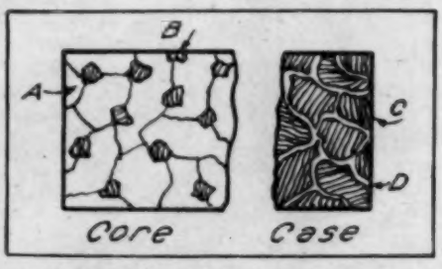

FIG. 1—SPECIMEN COOLED IN CASE HARDENING MATERIAL

Chemically, the steels in use at the present time in automobile construction, can be broadly classified as follows: Plain carbon; nickel; chrome nickel; chrome vanadium; chrome; manganese; silicon; molybdenum; and silicon nickel. The first four are the common types, while chrome and manganese steels are less common but are used widely for special work. Silicon and silicon nickel steels are more common abroad than in this country. Molybdenum steel has been used only for a few years but the outlook for its extended use is good.

No alloy steel is markedly superior to all others. It is self evident that if this were so, we would be using but one type of such steel. Each type has certain advantages and disadvantages. In order to obtain the maximum efficiency from a heat treatment it is necessary to thoroughly understand the peculiarities of that type. No automobile is made today which could not be made just as good if a different type of alloy steel properly heat treated were used. Frequently a part made of one type of steel does not give satisfaction in service and other steels are tried until one is found which is successful. In many cases the orignial steel would have proved satisfactory if the correct heat treatment had been applied. One type of alloy steel seldom is substituted for another due to defects in the manufacturing, but there are occasional cases.

Frequently a slight change in design will overcome difficulties which are ascribed to heat treatment or material, or both. As an example, a common source of trouble in an automobile is the twisting off of live axles. In most cars they are subject to a bending moment as well as torsion. These usually break at *A* or possibly *B* as shown by Fig. 2, because the bending moment is a maximum at this point. The usual procedure against this difficulty is to secure better steels. This failing, metal is usually added at *A* or *B*. As a matter of fact, if the design is otherwise correct and a good steel is used, the difficulty usually can be overcome by removing metal along the section *BC* and throwing the maximum bending moment away from *A* or *B*. Increasing the diameter of a fillet will frequently overcome trouble after much loss of money and time has been occasioned in the search for a better steel or a better method of treating the one in use.

Three Classes of Steels Used

Automobile steels subject to heat treatment can be classified broadly into low, medium and high carbon steels. Low carbon steel is usually case hardened. Its most important use is for gears, spring bolts, steering knuckle bolts, cam shafts and various other parts subject to wear. With the exception of the transmission, it is nearly universal practice to use case hardened gears for all purposes. A gear or any case hardened part subject to shock, must be treated differently from one not so subjected. Consider an axle driving pinion. After case hardening it consists of a low carbon core with a high carbon surface and, if it is allowed to cool in the case hardening material, it will have a structure similar

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From a paper presented at the eighteenth general meeting of the American Iron and Steel Institute, New York, Oct. 22. The author, R. R. Abbott, is head of the mechanical laboratory, Peerless Motor Car Co., Cleveland.

to that shown in Fig. 1, which is magnified.

The core consists of a matrix of soft iron *A*, with fairly large masses of pearlite *B* which are mechanical mixtures of carbide of iron and iron containing all the carbon in the steel. The case contains large masses of pearlite *C* surrounded by an envelope of carbide of iron, cementite, *D*. *A* is soft and ductile. *B* and *C* are harder and less ductile, while *D* is extremely hard and brittle. If this pinion is now heated to the hardening point and quenched, the steel is hardened but the general structural appearance is the same as in Fig. 1. The actual change which takes place consists in the formation of a solid solution instead of a mechanical mixture in the pearlite *B* and *C*. The brittle cementite envelope *D* now surrounds the hard solid solution *C* in the case and if a sudden shock occurs, this cementite will crack like glass; the rupture will be carried into the core where it acts like a nick in the surface of steel and the break will be carried through the entire piece, unless the area of the core is large compared to that of the case. This treatment is not suited for parts subject to shock.

If we now heat the same piece of steel progressively higher than the hardening temperature the pearlite *B* and *C* absorb or dissolve the surrounding iron *A* and cementite *D* until at some definite temperature we have a solid solution throughout the pinion, the only difference being that the solution made from the case is more saturated in carbon than that of the core. Upon quenching, this condition is retained to a greater or lesser extent. This uniform structure is far better able to resist shock than the previous one but it has two disadvantages: First, the absence of the cementite *D* in the case lowers the resistance to wear and; second, the size of the solid solution crystals depends upon the temperature to which they have been heated and, due to the high temperature used to obtain a uniform structure, the large surface crystals show a decided tendency to brittleness. Both of these disadvantages can be removed by a second quench from just above the hardening temperature. By this heating, both the iron *A* of the core and the cementite *D* of the case are thrown out of solution, but by virtue of this method of formation, they are in a very fine state of division. The cementite *D* is now in very small globules, which no longer allow a shock fracture to travel any distance; the result is a wear resisting case and a shock resisting core and case

It is very essential for the carrying out of this treatment that the temperatures at which the quenching takes place be controlled accurately. In order to do so there has been developed and used extensively, an electric heating furnace having a low heat retention value. The parts to be hardened are placed in it with the fire end of a pyrometer couple as near the center as possible. Due to the low heat capacity of the furnace it is cooled considerably; as the articles heat, the pyrometer is read on a recording chart and the curve shows a deflection the instant that the hardening temperature is reached due to the absorption of heat caused by the physical transformation. By this means, inaccuracies in the pyrometer have no effect, since we are not concerned with actual temperatures but with the time at which a transformation is occurring.

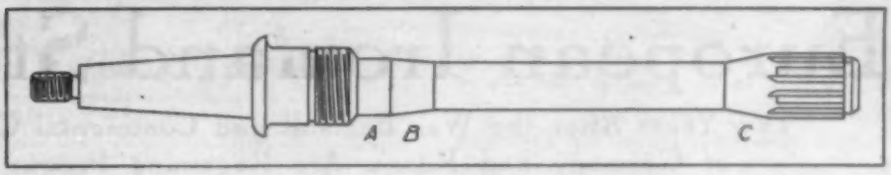

FIG. 2—FAILURE OF AUTOMOBILE AXLES USUALLY OCCURS AT *A* OR *B*

Medium Steels Not Case Hardened

By medium carbon steels in the motor car industry is usually meant those containing from 0.25 to 0.55 per cent carbon. Such steels are used for nearly all important parts which are not case hardened. For parts which are subject to high stress such as springs, the higher range of carbon is used; for torsional parts, such as live axles, intermediate carbons; and for parts subject to extremely high shock, such as steering knuckles and arms, the low carbons are used. Frequently but two divisions are made, spring steel and one containing 0.30 to 0.40 per cent carbon. The ideal treatment of this class of steel is that which will give a homogeneous solid solution with the smallest possible crystals. Usually this means a quench from slightly above the temperature of complete absorption of iron, or the upper critical temperature. After the quench, the steel is reheated to various temperatures to give the physical properties desired. The higher the reheating temperature, the lower the physical strength and the greater the toughness. Steels containing chromium, frequently require a preliminary heat considerably above the temperature of complete absorption.

Parts subject to great shock, such as steering arms and knuckles are drawn back to a very high temperature to give maximum toughness, while those subject to a constant high stress, such as driving axles, are drawn to a comparatively low temperature. Front axles and connecting rods and various similar parts usually receive an intermediate draw. This general treatment, irrespective of the temperature of draw, produces a homogeneous material instead of the mechanical mixture of untreated steel. The result is an increase in strength, toughness, fatigue and shock resisting properties. It is unfortunate that there is no commercial testing machine which will give us accurate data regarding shock and fatigue tests of steel. We do know, however, that if we produce this homogeneous structure and have a high degree of toughness, as measured by the reduction in area, the steel will resist fatigue and shock to the highest degree.

During the war the very peculiar fact was discovered that with some steels, particularly those containing chromium, higher shock tests could be obtained when the steel was quenched from the temperature of draw instead of cooling slowly. No difference in the other physical properties was found. In one instance, many crankshafts which met all physical specifications except shock test, were rejected. These were then drawn over and quenched from the low drawing temperature, following which they passed a high shock test. They were no better physically than they were before and their record in service was neither better nor worse than those which passed the shock test without this quench. In another instance, a tabulation of airplane motor crankshafts broken in service contained more which had passed a high shock test than those which had passed a low test.

Little high carbon steel is used in motor car construction. Plain carbon steel springs both flat and spiral are used with from 0.60 to 1.25 per cent carbon. Bearings with and without chrome and containing 1 to 1.25 per cent carbon are commonly used. Some hardened tool steel is used for small pins.

The heat treatment of steel is becoming more and more an exact science. In the near future very little experimental work will be necessary in the metallurgical laboratory. From the chemical analysis the correct heat treatment as well as the physical properties resulting will be calculated. Also, from our knowledge of the effect of different elements upon physical properties we will determine mathematically, the correct composition to produce required results.

European Iron and Steel in 1920

Two Years After the War England and Continental Countries with Exception of Germany and Russia Are Regaining Prewar Capacity—Has Influence on American Steel and Iron Industry

BY H. COLE ESTEP

AT THE outset, the writer feels he should try to make clear that this presentation is by no means a finished production and that in dealing with so vast a subject only the most striking features can be given attention. In other words, the result, instead of being a careful portrayal, will of necessity be little more than a rough charcoal sketch of the situation. This follows not only from the space limitations of a discussion of this sort, but from the writer's relatively limited experience in point of time in the Old World and the unavoidably superficial character of many of his observations.

In any analysis of this character it seems necessary first to go back to the days before the war. In the year, 1913, Europe produced about 42,000,000 tons of steel ingots. The first year after the war, 1919, found a dazed Old World able to deliver, in round numbers, only about 19,000,000 tons. The losses were chiefly in Germany, Russia, France and Belgium. This year, 1920, a somewhat more convalescent Europe will probably be able to turn out 24,000,000 tons of steel. This represents an increase of over 26 per cent compared with 1919. The writer thought he might venture to present these few figures first, because a good deal has been said about Europe's waiting on the American doorstep and not so much about what she is doing herself.

But there still is plenty to do. Her production is not yet 60 per cent of the prewar maximum, while prices generally speaking are four to five times what they were. In other words, the European iron and steel business, like every other industry in the world, is going through a process of readjustment to a new economic level. Just what that level finally will be no man knows, for the forces let loose at the end of the war have by no means spent themselves.

Owing to its vast capacity the American iron and steel industry is peculiarly sensitive not only to conditions within our own country but to those in the outside world as well. For this reason, and also on account of the broad-gaged character of its leadership, the American iron and steel business is one of the most progressive of our great industrial enterprises. Numbering among its

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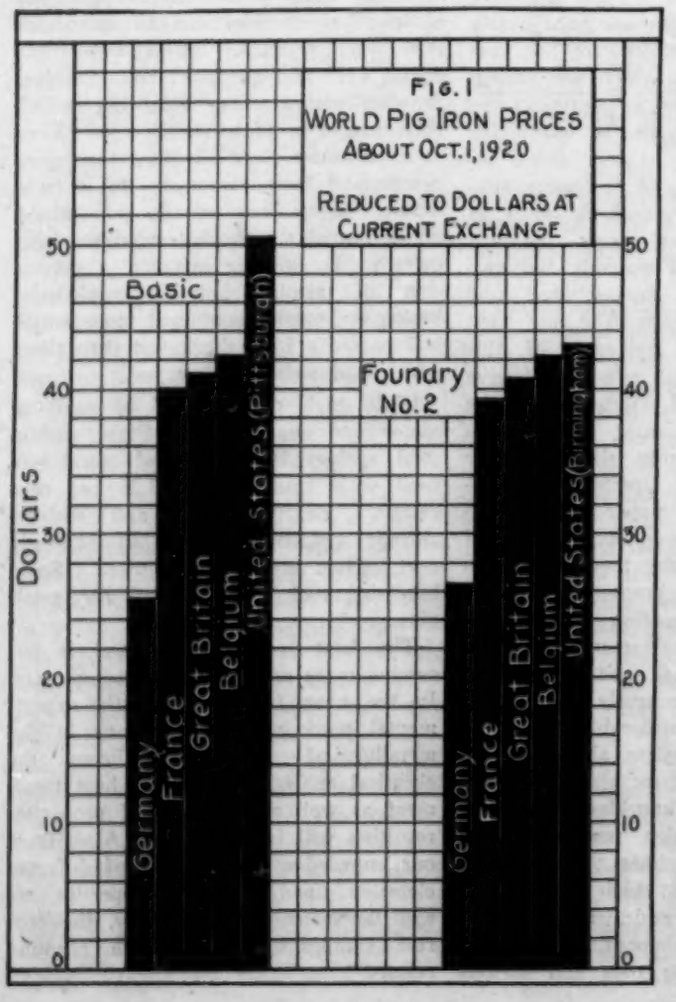
From Mr. Estep's illustrated paper, "European Iron and Steel Two Years After the War," read at the American Iron and Steel institute, New York, Oct. 22, 1920. Mr. Estep is European manager of THE IRON TRADE REVIEW.



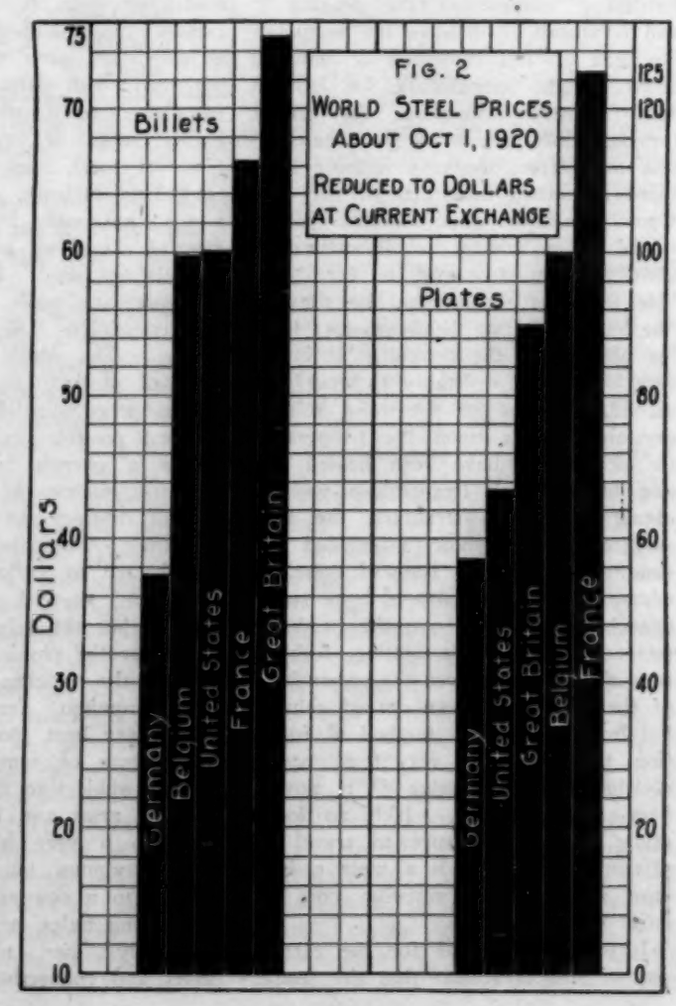


TABLE I

Pig Iron Prices in the World's Markets

Reduced to Dollars Per Gross Ton at Current Exchanges

BASIC IRON

	1919				1920			
	Jan. 1	Apr. 1	July 1	Oct. 1	Jan. 1	Apr. 1	July 1	Oct. 1
United States Pittsburgh	$31.40	27.15	27.15	27.15	38.40	44.40	46.15	50.46
Great Britain Middlesborough	23.75	23.20	35.80	34.25	31.40	42.30	44.80	41.00
Germany Dusseldorf	24.70	25.10	24.00	20.00	10.20	27.60	43.00	25.50
France Northeastern	.....	.....	.....	.....	.....	34.00	42.00	40.00
Belgium	.....	.....	.....	.....	.....	45.00	70.00	42.10

No. 2 FOUNDRY IRON

United States Birmingham	$31.00	26.75	25.00	27.45	37.00	41.00	42.25	42.00
Great Britain Middlesborough	22.50	22.00	35.80	33.20	30.50	39.00	43.00	39.20
Germany Dusseldorf	26.60	28.70	27.00	22.20	11.00	28.40	44.75	26.30
France Northeastern	.....	.....	.....	.....	.....	36.40	45.00	40.60
Belgium	.....	.....	.....	.....	.....	47.00	72.00	42.10

units, pioneers in the export field, the industry represented by the American Iron and Steel institute already has taken its place among world's greatest international traders. To hold this position it seems necessary to make a closer study of foreign markets, production and requirements than ever before, for it is probable that before long the United States will have a quantity of steel to export equal to the entire production of Great Britain at the present time. In view of these necessities, is it in order to look with apprehension on the renewed iron and steel producing energies of Europe, specially the growing outputs of England, France, Belgium, Germany and the new states of central Europe? The writer thinks not. At the present time, the world's total steel output is nearly 20,000,000 tons per year short of the maximum reached during the war. This would seem to indicate that the point of saturation, from a production standpoint, has not yet been reached or even approached.

In addition, so far as our dealings with Europe are concerned, is it not logical to suppose that a much vaster trade waits only on more complete recuperation in the Old World? Volume of business depends largely on purchasing power. Is it not safe to assume, therefore, that growing European production, including iron and steel, will in turn create a purchasing power which will quicken powerfully the interchange of business with the United States? In other words it is the old story of the prosperous man buying more goods than the bankrupt.

The stimulation of our export trade in iron and steel, which the writer firmly feels will go hand in hand with the economic rehabilitation of Europe, necessarily will not be confined to direct shipments to the old countries. Increased exports should also take place to the Far East, to Africa, to South America and the Antipodes, as Europe gradually resumes her custom of investing in new enterprises in those parts of the world—assuming always that our competitive position as to cost of production, prices, deliveries, etc., can be maintained.

It is the writer's feeling that our iron and steel exporting future is more or less closely bound up with the re-establishment of normal iron and steel production in Europe. Such increased production will, it is very probable, bring about much more severe competition in international markets, but this very thing, if it be conducted along the liberal lines of mutual tolerance so ably and powerfully advocated by Judge Gary and other leaders of the American iron and steel industry, should serve to stabilize conditions and so reduce the tremendous uncertainties of the present moment. And with confidence once re-established who could gage the tremendous volume of profitable business awaiting the world's productive enterprises?

It would now appear there are three stages to the world's postwar industrial reconstruction. First came the period of replacement of necessities. This took place all over the globe, in neutral as well as the former belligerent countries, and resulted in a tremendous wave of buying, without regard to cost, prices, or values, which have only recently receded. This rush of demand was so great that it overwhelmed such increases in production as the world has been able to achieve since the armistice, and consequently the prices of many commodities, including iron and steel, have been driven to heights which even during the war would have been considered fantastic. But there are plenty of signs that the grand rush now is over.

Overlapping the period of replacement of necessities—and a good many things which were not necessities—is the period which we now would appear to be in the midst of, that of labor and price readjustment. We are headed for the new economic level, but the terminus is not yet in sight. With this second period, of readjustment of values, will come, perhaps sooner rather than later, the re-establishment of competition—intranational and international.

A general survey of postwar prices of the principal iron and steel products, including foundry and basic pig iron, billets, plates and bars, in the United States, Great Britain, Germany, France and Belgium, is presented in some detail in Tables I and II. The figures in each case have been reduced to dollars at the various prevailing

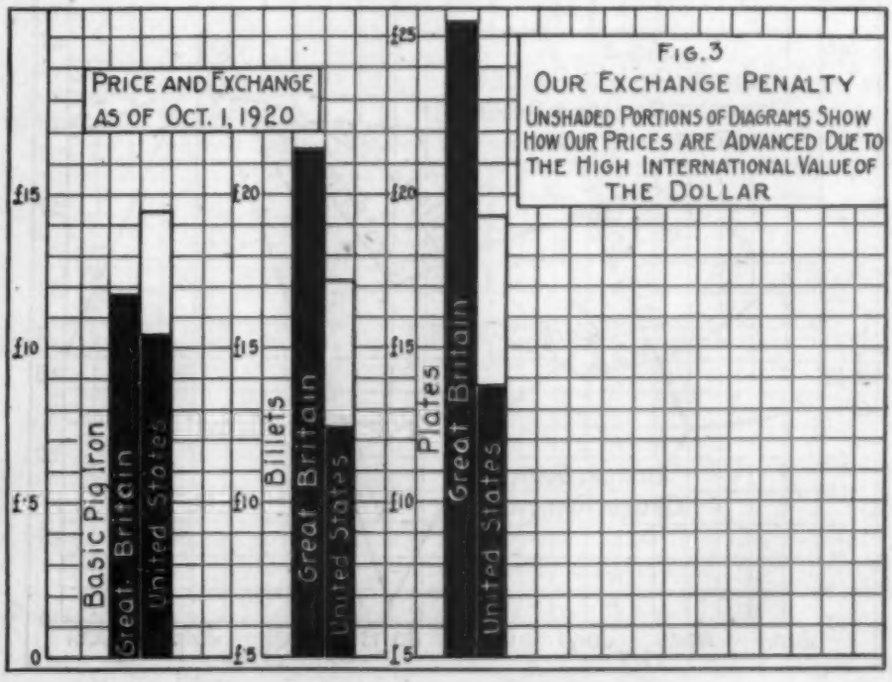


FIG. 3
OUR EXCHANGE PENALTY
UNSHADED PORTIONS OF DIAGRAMS SHOW HOW OUR PRICES ARE ADVANCED DUE TO THE HIGH INTERNATIONAL VALUE OF THE DOLLAR

TABLE II

Steel Prices in the World's Markets

Reduced to Dollars Per Gross Ton at Current Exchanges

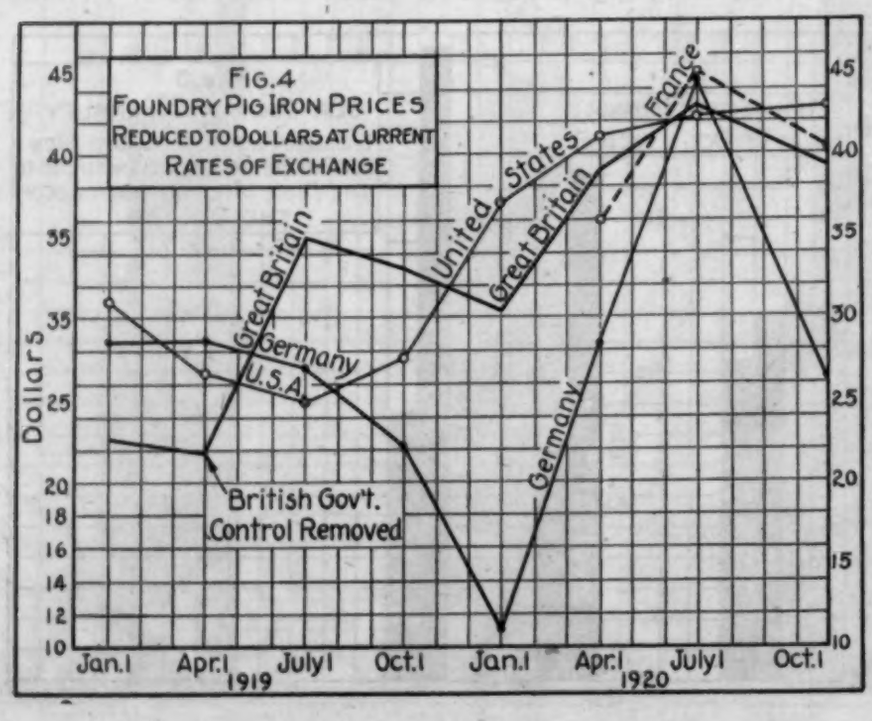
BESSEMER OR BASIC-BESSEMER BILLETS

	1919				1920			
	Jan. 1	Apr. 1	July 1	Oct. 1	Jan. 1	Apr. 1	July 1	Oct. 1
United States Pittsburgh	$43.50	38.50	37.30	39.30	47.50	67.50	62.50	60.00
Great Britain Middlesborough	.....	.....	60.25	62.25	64.50	101.00	98.60	75.00
Germany Dusseldorf	33.30	33.00	25.50	25.75	17.60	50.00	69.75	37.50
France Northeastern	.....	.....	.....	.....	65.00	67.00	71.50	66.25
Belgium	.....	.....	.....	.....	68.00	70.00	96.00	59.75
SHIP AND TANK PLATES								
United States	$65.40	58.40	58.40	58.40	61.60	67.20	67.20	67.20
Great Britain	.....	.....	77.10	75.75	81.25	91.50	98.60	89.10
Germany	43.20	42.25	38.80	40.25	26.80	75.25	102.00	57.00
France	.....	.....	.....	.....	85.00	90.00	139.00	125.50
Belgium	.....	.....	.....	.....	90.50	96.00	132.00	99.00
STEEL BARS								
United States	$54.00	47.00	47.00	47.00	56.00	72.75	78.40	78.40
Great Britain	.....	.....	85.75	76.25	82.25	110.00	122.30	105.00
Germany	78.50	36.80	34.75	33.80	20.90	58.40	80.00	45.00
France	.....	.....	.....	.....	101.00	110.00	110.00	98.75
Belgium	.....	.....	.....	.....	106.00	114.00	120.00	73.25

rates of exchange. In no other way can adequate comparisons be made owing to widely fluctuating monetary conditions. These statistics presented in this way bring out some exceedingly interesting, even startling, facts, but since the position at the moment is always of most importance, the figures for Oct. 1, 1920, have been charted and are shown graphically in Figs. 1 and 2, Fig. 1 showing pig iron prices on Oct. 1 and Fig. 2 the prices of billets and plates on the same date.

It should perhaps be explained that in arriving at these prices, both for the diagrams and the tables, average figures have been selected as far as possible. In all countries at the present time very wide spreads are in order, and since comparisons between a range of prices tend to be extremely confusing, definite medium figures have been chosen, such as 3 cents a pound or $67.20 a gross ton, for American plates on Oct. 1. This procedure would appear to be in order since these prices are presented for purposes of comparison rather than of quotation.

As Fig. 1 shows, American pig iron prices are at present the highest in the world. Our steelmaking pig iron is about $8 a ton more than that of our nearest European competitor, Belgium, and $9 a ton more than British basic iron. The range between our northern foundry irons and European foundry pig is about the same; in the case of southern foundry iron we are in a somewhat more favorable position, as shown in Fig. 1, but even in the case of this relatively low-priced metal our prices are considerably higher than those of France, Great Britain and Belgium, and of course much higher than those of Germany.



Turning now to steel prices, charted in Fig. 2, we find a more satisfactory state of affairs. Our current quotations on billets, for instance, are about $6 a ton under the French price and $15 a ton under the Britsih price. Our billets, however, are slightly higher than those of Belgium—and this by the way is simply another index of the wonderful recovery made by that little country.

On ship plates, our prices for the time being are about $11.50 a ton under the British market, $16.50 a ton under Belgium, and $62 under France, where special conditions obtain. Only German plates are lower than ours, yet Germany recently is understood to have placed large shape plate orders with American selling agencies. Conditions, although slowly righting themselves, are still topsy turvy, and prices do not exert their normal influence on market movements.

The relative international situation in the prices of steel bars, which have not been charted, is about the same as obtains in the case of billets and plates. Current transatlantic freights on heavy iron and steel products range from $10 to $20 a ton, and in most cases this places even our more favorable prices on a noncompetitive basis, while adding further to the handicap under which our pig iron is laboring.

Our best chance at the moment appears to be to export billets or plates to Great Britain. Fortunately these are commodities which the United Kingdom stands in need of, and a study of export statistics shows that considerable trade of this character is moving.

So far as competing in Europe is concerned, most of our price troubles at the present time are founded not on manufacturing conditions, but on a factor almost entirely beyond the control of the iron and steel producers—namely, the rate of exchange. The foreign value of our money is so high that we are penalized anywhere from 25 to 75 per cent or more on all transactions in Europe. Take a mild case, Great Britain for instance. In Fig. 3 has been charted the effect of the high value of the dollar on our prices for basic pig iron, billets and plates, compared with prices obtaining in English markets, as of Oct. 1. In the case of pig iron, the higher price of the American product is due entirely to the exchange position; turning to billets and plates, if exchange were normal, our quotations would be around half of those asked by English mills and our competitive position correspondingly strengthened. The almighty dollar is anything but a help at present to our steel exporters.

The effect of the rate of exchange

is even more vividly demonstrated in the case of Germany. Reduced to a dollar basis our prices are about double those of Germany at the present time, but on the basis of the prewar value of marks, German prices are at least six times higher than our own. German foundry pig iron is 1659 marks per ton; at normal rate of exchange this is $332! But by virtue of this same exchange factor, to meet German competition purely on a price basis we should have to scale our own foundry pig iron down to $26.30 a ton at the present time, to say nothing of transportation charges. Yet American steel is moving into Holland, within a stone's throw of Germany's greatest steelworks. This is due partly to the fact that the German long since has stopped giving the foreign buyer the full benefit of the rate of exchange, applying an additional charge which he picturesquely calls *die Valuta*. But more important still, Germany hasn't got the steel to deliver.

The position of exchange is in fact the dominating consideration in European iron and steel prices, and not until exchanges are righted, or at least stabilized, can the American exporter feel he is on safe ground. This leads back naturally to the argument presented in the earlier part of this paper in which an attempt was made to show that the American iron and steel business would in the long run profit from the restoration of production in Europe. For it is generally admitted that the only way exchanges can be righted is for Europe to produce more goods. As production increases, including iron and steel, exchanges gradually will become more normal, and the competitive position of the American producer more secure.

But until that day comes American exporters must continue to be close students of international finance. Generally speaking, before the war, there were only three factors controlling export business, the price at home, the price abroad, and the freight; today there are four factors in every transaction, the prices at home and abroad, the transportation charges, and the rate of exchange—and frequently the most important of these rapidly shifting elements is the exchange.

Widely fluctuating as international prices have been during the past two years, nevertheless twice since the end of the war the quotations in all of the principal countries nearly have coincided. This occurred first in May and June 1919 and again in July of this year. In order to bring this fact out clearly, Fig. 4 has been prepared, showing graphically the figures given under foundry pig iron in Table I. Other pig iron and also the steel prices exhibit the same phenomenon,

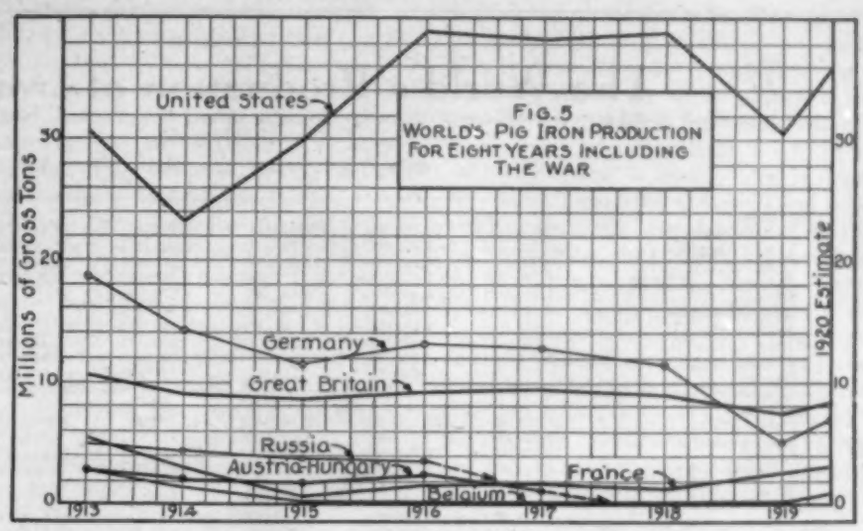


FIG. 5
WORLD'S PIG IRON PRODUCTION FOR EIGHT YEARS INCLUDING THE WAR

but the illustration is most vivid in the case of foundry pig iron. The coincidence in these prices in July of this year is particularly striking, the German, British, French and American figures all being in the neighborhood of $43 for a time; the coincidence in May and June, 1919, soon after the removal of British government control, is only less striking, prices at that time coming together in the neighborhood of $27 a ton. Following each of these conjunctions, the quotations, acting under the influence of movements in the rate of exchange and local market conditions, have shown a wide divergence. Belgian pig iron prices, it might be added, have followed a path of their own, owing to the abnormal rise in Belgian exchange this year and to other factors.

Generally speaking, the price swings shown in Fig. 4 indicate that the period between the times of greatest conjunction and divergence is from six to eight months. These pendulum-like movements show the efforts the world's markets are making under the action of natural economic laws to re-establish their equilibrium. As time goes on the swings can be expected to become less violent. If any deduction can be made from a study of these postwar international iron and steel price phenomena, it is that if the governments of the world can only be persuaded to stop tinkering with the movements of commerce, currencies, exchange, and other fundamental factors, commodity prices can be depended on to find their own levels at about the same range of values in the producing countries.

It was stated previously that the reason Germany does not get all the steel business in the world is that she has not the steel to deliver. This brings us to another great factor in the international iron and steel situation—the element of production. Some general world figures already have been quoted. The details of the world's iron and steel output, so far as they are known at the present time, covering the past seven years, are shown in Table III. An estimate of the output for 1920, based generally on the figures for the first six months, is included in this table.

In order to show these same facts regarding production in graphic form, Figs. 5 and 6 have been prepared covering the pig iron and steel outputs of the different countries of the world

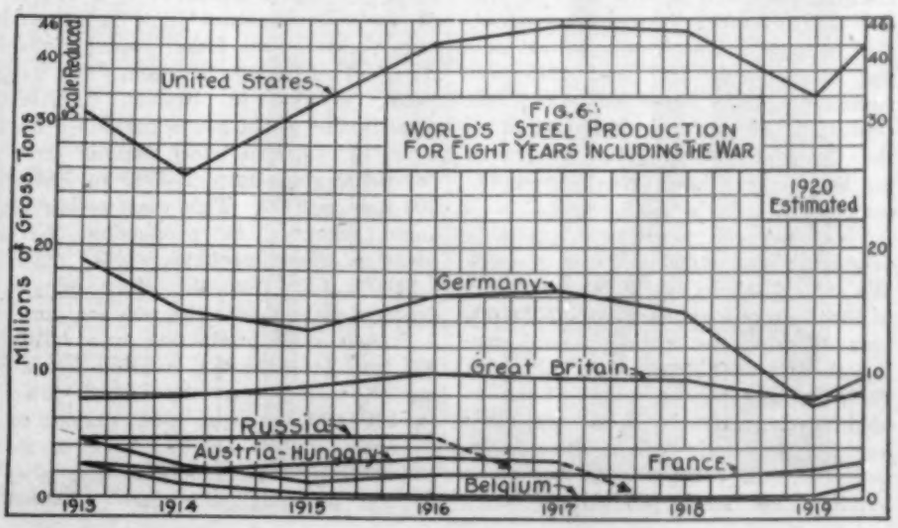


FIG. 6
WORLD'S STEEL PRODUCTION FOR EIGHT YEARS INCLUDING THE WAR

TABLE III

The World's Production of Iron and Steel

PRODUCTION OF PIG IRON AND OF STEEL, AND EXPORTS OF IRON AND STEEL, OF THE PRINCIPAL PRODUCING COUNTRIES YEARLY FROM 1913 TO 1920.
(In tons 2,240 pounds)

	1913	1914	1915	1916	1917	1918	1919	Estimated Annual Rate in 1920
PIG IRON								
United States	30,966,000	23,332,000	29,916,000	39,435,000	38,621,000	39,055,000	30,586,000	36,284,000
United Kingdom	10,260,000	8,924,000	8,794,000	9,048,000	9,322,000	9,086,000	7,393,000	8,290,000
Germany	19,000,000	14,159,000	11,601,000	13,071,000	12,931,000	(b) 11,672,000	(c) 6,192,000	7,000,000
France	5,126,000	2,648,000	577,000	1,465,000	1,707,000	1,286,000	(d) 2,374,000	3,000,000
Russia	4,484,000	4,189,000	3,631,000	3,678,000	?	?	?	?
Austria-Hungary	2,343,000	1,956,000	1,928,000	2,379,000	?	?	?	?
Belgium	2,428,000	1,432,000	67,000	126,000	8,000	?	?	774,000
Italy	420,000	379,000	372,000	460,000	463,000	209,000	?	?
Canada	1,015,000	706,000	825,000	1,070,000	1,046,000	1,066,000	?	?
Sweden	718,000	630,000	749,000	721,000	816,000	738,000	489,000	?
STEEL								
United States	31,301,000	23,513,000	32,151,000	42,774,000	45,061,000	44,462,000	34,000,000	41,863,000
United Kingdom	7,664,000	7,835,000	8,550,000	8,992,000	9,717,000	9,539,000	7,894,000	9,754,000
Germany	18,631,000	14,707,000	13,046,000	15,924,000	16,322,000	(b) 14,738,000	(c) 7,644,000	8,400,000
France	4,614,000	2,614,000	1,071,000	1,921,000	2,196,000	1,780,000	(d) 2,151,000	2,800,000
Russia	4,760,000	4,656,000	4,822,000	?	?	?	?	?
Austria-Hungary	2,584,000	2,125,000	2,631,000	3,277,000	2,872,000	?	?	?
Belgium	2,428,000	1,370,000	97,000	97,000	9,000	?	?	960,000
Italy	918,000	896,000	993,000	1,249,000	1,311,000	976,000	?	?
Canada	1,04 ,000	743,000	913,000	1,287,000	1,562,000	1,690,000	1,000,000	1,400,000
Sweden	582,000	499,000	590,000	604,000	572,000	517,000	462,000	400,000
EXPORTS OF IRON AND STEEL								
United Kingdom	5,049,000	3,972,000	3,248,000	3,356,000	2,345,000	1,617,000	2,225,000	3,304,000
United States	2,746,000	1,550,000	2,533,000	6,101,000	6,439,000	5,375,000	4,336,000	4,305,000
Germany	5,664,000	?	?	?	?	20,000	(a) 113,000	200,000
France	578,000	338,000	39,000	59,000	69,000	36,000	453,000	827,000

(a) Eleven months only.
(b) Does not include surrendered districts after October, 1918.
(c) Estimated for November and December, 1919.
(d) Includes Alsace-Lorraine in 1919 and thereafter.
Figures courtesy of M. S. Birkett, D.B.E., (British) National Federation of Iron and Steel Manufacturers, amplified as to 1919 and 1920 by the author.

through the war period and since. These diagrams show clearly the collapse of Germany, the extinction to all practical purposes of Russia and the Hapsburg kingdoms, and the recovery of France and Belgium.

The position as regards production since the war, compared with 1913, is shown in Fig. 7. This diagram shows very clearly that in spite of the gain in output this year over 1919, which amounts to 22 per cent, the world is not yet producing steel at anything like the prewar rate. In 1913 the world turned out about 74,500,000 gross tons of steel; to feed the hungry mouths of the nations' guns this output was jacked up to some 82,650,000 gross tons in 1917. From then on until the latter part of last year the slump was continuous, and in 1919, the first postwar year, the whole world could muster only a little over 52,000,000 tons to meet its vast reconstruction program. The loss in annual output as between 1917 and 1919 was something like 30,000,000 tons, the equivalent of the entire production of the United States in 1913. One need go no further than this to find the reason for today's steel prices.

This year the world will probably produce about 64,000,000 tons of steel. We are still about 10,000,000 tons short of the prewar maximum and 18,000,000 tons off from the world's record during the war. The gain in 1920 over 1919, for the world as a whole, as mentioned previously, is 22 per cent; but Europe's gain taken alone is 26 per cent. In other words Europe is building up steel production faster than the rest of the world. This is as it should be considering the enormous losses which have been sustained.

Looking at these figures another way we see that the tremendous burden of steel production which is being carried by the United States is not being lessened very rapidly. In 1913 we turned out 42 per cent of the world's steel; in 1919 our share was 65 per cent; this year it will be cut down by only one figure to 64 per cent.

The most striking change growing out of the war in the whole European iron and steel situation is the collapse of Germany and the consequent rejuvenation of France. Never has there been a more striking example of poetic justice worked out in a practical way, for all of Germany's great iron and steel strength was founded on her forcible possession of the lion's share of the Lorraine ores—a source of raw material second only in importance to our own Lake Superior district. This great heritage now has been restored to France. Consequently the world has witnessed a decline in German steel output from 18,631,000 gross tons in 1913 to 7,644,000 tons in 1919. This year, owing to some recovery in production, Germany's effort probably will reach 8,400,000 tons, but the glory of the departed days before the war are gone.

French steel production was 4,614,000 tons in 1913; the invasion following the war forced the output down to 1,071,000 tons; in 1919, thanks to Lorraine, it had climbed back to 2,151,000 tons, and this year the production probably will reach 2,800,000 tons. Today France is the only country in Europe whose exports are in excess of those in 1913, so far as iron and steel is concerned.

But France's great strength lies not so much in her production or exports at the present time as in her great wealth of raw material and its potentialities. Her iron ore reserves reach the staggering total of nearly 6,000,000,000 tons. Her ore producing capacity is around 40,000,000 tons a year, which, given suitable furnaces, would mean a pig iron output of 10,500,000 tons. France's production bids fair to exceed even that of Great Britain. Her iron and steel future is almost beyond doubt the most brilliant among the Old World nations.

The great handicap which the French iron and steel industry must overcome lies in the question of fuel supplies. This brings us to another of the several fundamental factors affecting production in Europe—the coal question. Coal and transportation lie at the very base of the iron and steel production pyramid. Relatively adequate coal supply has enabled British steelmakers to boost their ingot production to 30 per cent in excess of the prewar rate. England is the only country in Europe which now is making more steel than it did before the war. A fairly good coal output is all that prevented an even greater collapse of German iron and steel production than actually took place. Before the war France was using 7,000,000 tons of coke per year; today she is getting only 4,200,000 tons and needs 12,000,000 tons to realize on all her

present available resources of iron ore.

Compared with 1913 the European fuel situation still leaves much to be desired. In the prewar year the average monthly output of coal was 44,000,000 tons; at present it is not over 33,000,000. This loss of 25 per cent means strangulation to Europe's efforts to rebuild her iron and steel industries. The deficiency is due principally to loss of production in England and Germany, amounting to 6,000,000 tons a month in the former country and nearly 4,000,000 tons in the latter. Since the armistice, however, Germany has increased her coal production by 25 per cent. The British output is practically stationary.

The loss of coal production in Great Britain does not affect the island kingdom as much as it does her neighbors since the curtailment has been confined chiefly to export fuel. France in the absence of support from her ally is turning to Germany for the coke necessary to build up her iron and steel production. A considerable trade along these lines, French ore for German coal, is inevitable in the future.

What Europe really needs, however, to put its whole iron and steel business on a sounder footing is an increase in the output of British coal to its prewar volume, thus permitting a huge exchange of Lorraine ore for British fuel. This would not only enable France to make more iron and steel, but at the same time it would increase the British pig iron output through improvement in the furnace burdens and fuel supply. This would close up the dangerous gap which now exists between pig iron and steel production in Great Britain, and enable that country to realize her full potential steel capacity of about 12,000,000 tons per year. Germany at the same time would not be in danger of having her own plants drained of necessary fuel supplies.

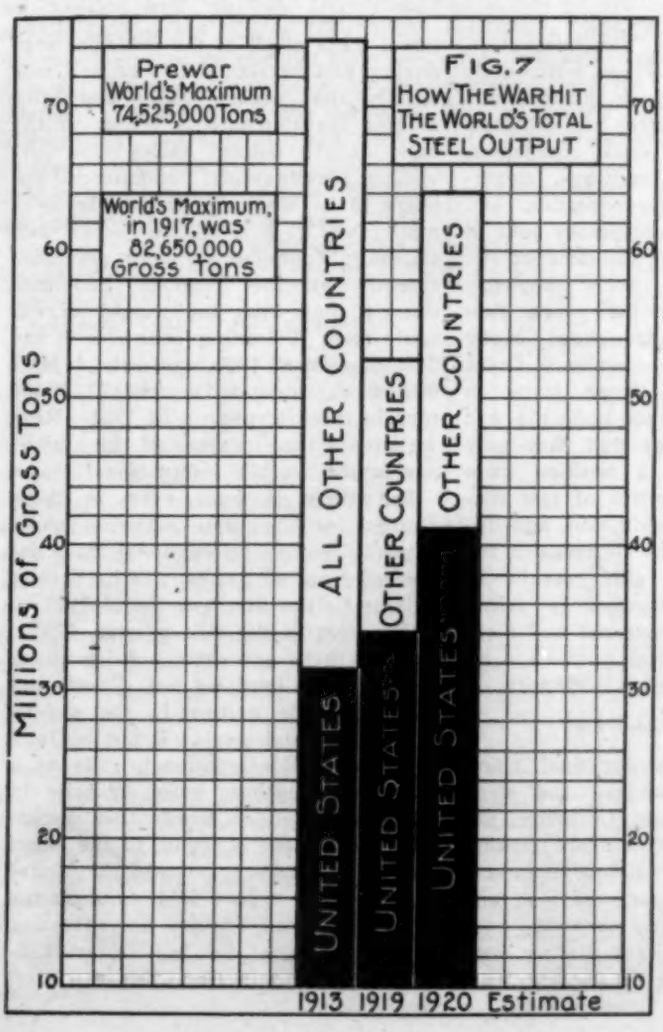
If German coal production could be further increased by some 3,000,000 tons per month, together with an advance in British production of 4,000,000 to 6,000,000 tons a month, then conceivably European steel production would range itself as follows:

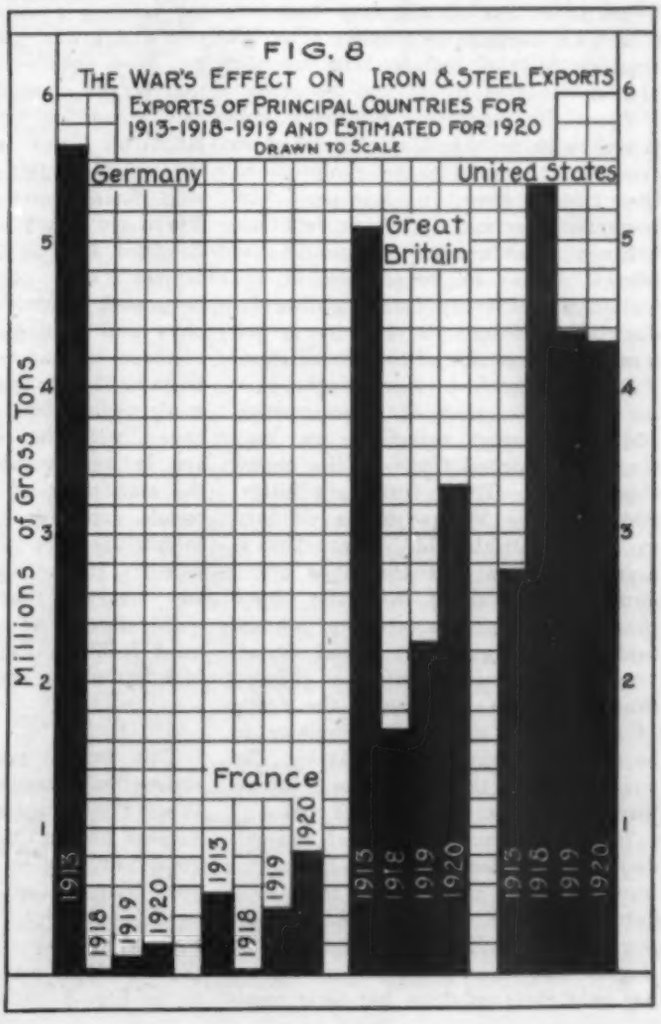
	Tons Per Year
Great Britain	12,000,000
France	10,000,000
Germany	10,000,000
Belgium	3,000,000
Italy	1,000,000
Sweden	600,000

This foots up to 36,600,000 tons a year. Russia and the new states of central Europe would have to be depended on eventually to provide the remainder of the required tonnage. How necessary a reorganized and vigorous Russia is to the world's industrial wellbeing becomes evident from these considerations.

The foregoing is doubly true in view of Russia's baleful influence on the world's working population. Unwilling to confine their tragic experiment to their own people, the fanatical disciples of Lenine and Trotsky have set the labor of the world by the ears, nowhere more so than in war-torn Europe. Italy for two weeks burst into flame and then subsided; England has by no means escaped. Welsh miners instead of digging much needed coal have been holding bolshevist meetings 900 feet underground. There is no doubt now that a plot was hatched in August and September by the British extremists looking to the establishment of a soviet in Great Britain through the joint efforts of the labor council of action and a national coal strike. The plot failed to mature only because it became perfectly clear that the people would tolerate no nonsense.

At the moment of writing the labor situation in Europe in industries antecedent to the iron and steel production, still is trembling in the balance,





with the tendency, if anything, apparently toward more stable conditions. After an acute crisis, artificially induced by the labor leaders, the British coal miners have been led to discuss the wage question on a piecework basis for the first time in six years. This presages a somewhat better situation in Britain's basic industry. But at the best, the miners are holding England to ransom, and at the worst a tremendous strike may occur in the future. As one factor in the price of peace, the British miners practically have dictated an indefinite continuance of government control of the coal industry—this has been done in order to further their schemes for nationalization.

Last month the Italian iron, steel and metalworkers centering chiefly around Milan forcibly seized some 400 metalworking plants, and attempted to operate them themselves, without the aid of technical assistance or management. This attempt at communistic operation was a dismal failure; the men have restored the plants to their rightful owners and have gone back to work. But the settlement is entirely unsatisfactory from the standpoint of American free industries. Under government pressure the employes have been obliged to acquiesce in the establishment of workmen's shop committees with alleged wide powers to interefere in the management of the plants.

These incidents in industries collateral with iron and steel production are cited to indicate the evolution of the closed shop in Europe. The writer, if he may offer an opinion, believes that beyond any doubt the biggest lesson to be learned in the United States today from existing industrial conditions in Europe is the tremendous menace of the closed shop. Europe is much further advanced in labor evolution than our own country, and in Europe, therefore, we may study the ripened fruits of the closed shop policy. These fruits are bitter; and they are by no means confined to the industrial field. European experience proves that the labor union domination resulting from the closed shop quickly spreads into the political field, and brings about actual or attempted political dictation. Judging from European experience, the fruits of the closed shop would appear to be twofold—tyranny and anarchy. The writer realizes this is a strong indictment, but it is not unconsidered.

This would make it almost self-evident that the leaders of the American iron and steel industry, in their long battle for the maintenance of fair, open shop conditions, in the face of threats and duress, have been serving not only their industry, but their country itself, to an extent which probably even they to any degree have not appreciated.

Wages About on a Par

So far as wages in the European iron and steel industries are concerned, as compared with those in the United States, they may be dealt with briefly. The actual rates of course are subject to considerable variations in the several countries, and in making comparisons the rate of exchange is a factor. Generally speaking wages have increased more abroad than in the United States, and the relative difference is less pronounced at the present time than ever before. Owing to the sliding scales in operation in Great Britain, for instance, blast furnacemen's wages are now 250 per cent above the prewar standard, and open hearth melter's wages are 180 per cent above the antebellum figures. Generally speaking wages in the European iron and steel industry today are only slightly below those paid in the United States. The hours of labor are somewhat less, the 8-hour system being practically universal.

Since the war there has been tremendous integration of iron and steel properties throughout Europe. This constitutes another fundamental factor tending toward increased production and lower costs. The integration has been both vertical and horizontal; that is, the mergers have included not only competing interests but collateral industries such as coal companies, limestone properties, railways, steamship lines, iron ore properties, etc. There are plenty of companies both in England and on the continent at the present time that are completely integrated, controlling their own supplies and facilities throughout. Many of these companies, especially in Great Britain, have spent large sums in modernizing their plants since the war ended, with the result that they now are in as favorable a position from the standpoint of control of raw materials, economical production, and up-to-date facilities as any concerns in the world. If the idea still prevails in any quarter that Europe is asleep with reference to commercial and technical facilities for steel production, it had better be discarded forthwith.

Exports Recovering

This brings us to our final point, international trade in iron and steel. With the exception of Germany, the nations of the Old World are making good progress in rebuilding their export trade. The exports of iron and steel in 1913, and since the war, from Germany, France, Great Britain and the United States are shown graphically in Fig. 8 and in greater detail in Table III. The most striking feature of this diagram is the tragic failure of Germany's export ambitions. Germany still holds the world's iron and steel export record in times of peace with overseas shipments of 5,664,000 tons in 1913. Today her trade is less than 4 per cent of its former volume. This trade is destined to increase, to be sure, but it is hopeless to expect it to approach anywhere near its previous volume at any time within the measureable future.

France alone among the nations of the Old World is exporting more iron and steel at the present time than prior to the war. This year her outgoing shipments, it is estimated, will exceed those of 1913 by 43 per cent. The total volume of this trade still is small, but as previously suggested it is indicative of France's iron and steel future.

In the export field, Great Britain is the only country which appears to offer any prospect of serious competition with the United States in the next few years. Although still nearly 2,000,000 tons a year under the prewar rate, British export trade in iron and steel has more than doubled since the armistice, and given a reasonably secure situation, is destined to experience a further heavy increase.

There is no reason why the international trade of all of the principal producing nations should not expand materially after present labor and price tangles are eliminated. While on the basis of the inflated values now prevailing, international commerce appears to be breaking all records, as a matter of fact it is still far below par. Carefully compiled statistics published recently by the Supreme Economic council show that the weight of exports from 19 leading countries in the first quarter of 1920 was only 44,500,000 tons, compared with 72,100,000 tons in the first quarter of 1913. Here we have a true measure of the shrinkage in the world's international trade.

But there is hope even in these figures, for the same statistics show that the world's international trade increased from 45 per cent of its prewar volume in the first quarter of 1919 to 62 per cent in the first quarter, 1920.

From these and other considerations already cited may we not expect that America's true destiny in the exporting of iron and steel will not be fully realized until international trade as a whole approaches more closely to normal. In other words this discussion ends where it began, to the effect that the iron and steel future of the United States in the export field waits on the rehabilitation of Europe, not excepting Russia, and on the full re-establishment of Europe's own iron and steel production.

Advantages of Larger Hearth Area

Blast Furnace Hearth Dimensions Have Been Increased with Marked Success Over the Accepted Standard Without Interfering with the Height or Angle of Bosh—Larger Tuyeres Tend To Keep Bosh Clean

BY WALTHER MATHESIUS

ONE of the incidental yet not negligible advantages of the larger hearth is its greater accessibility. Increased diameter results in greater peripheral distances for arranging feed and discharge pipes for cooling water and affords more working space around the tuyeres, blow stocks, and the columns as well as between the iron and cinder runners near the furnace. The cast house work and also the mechanical maintenance therefore becomes easier and simpler.

In order to illustrate the extent to which hearth dimensions have grown in recent years, I might mention that the average hearth diameter of all 22-foot bosh furnaces at the South Chicago plant of the Illinois Steel Co. was increased from 16½ feet in 1911 to 18½ feet in 1919, and that the best average monthly production of these same furnaces equaled 512 tons per furnace and day in December, 1911, as against 556 tons in May, 1920. For this increased output the adoption of larger hearths is primarily responsible, no enlargement of the furnaces or important changes of lines above the bosh having been made. The fuel consumption per ton of iron for the two periods cited above were 2053 pounds in December, 1911, and 2037 pounds in May, 1920.

Affords Relief from Jamming

Lately, however, larger hearths have enabled modification of the stack lines, which were not practicable before, although their desirability had been felt for some time. Particularly for operations where soft, easily reduced ores are used, which are known to have a tendency to swell under the influence of the reducing furnace gases, the suggestion had been made that the uniform descent of the stock might be facilitated by increasing the batter of the stack lining, thereby reducing the "jamming" tendencies as well as friction. One way to obtain this would seem to require merely a decrease in the diameter of the stock line. This, however, did not appear to be permissible on modern fast driven furnaces, using a large percentage of fine ores, since the gas velocity at the stock line, which, all other things being equal, must necessarily be determined by the available area, was known to be so high in many cases as to keep the surface of the charge in more or less constant agitation. Thus, the limit would be closely approached beyond which dust losses would rapidly grow to excessive proportions. The diameter of the bosh, on the other hand, appeared to be controlled definitely by the limits of hearth dimensions and bosh angles. The only means remaining then, of obtaining at least a slight increase in the stack batter was to carry the straight stock line section down lower into the furnace and thereby reserve the relief offered by a greater outward slope of the furnace walls for that part of the travel, in which the swelling of the ore and consequently the friction was thought to be most prominent.

With the removal of these assumed limitations of hearth dimensions the situation has changed. Hearth diameters of 20 feet and larger are in satisfactory operation and the opportunity is now here to increase the bosh diameter over the rather commonly accepted 22-foot standard without sacrificing anything in suitability of bosh angle or height. The result to be expected from such designs, should, of course, be a freer working of the furnace, that is, regular descent of the charges and, other conditions being equal, a lower blast pressure. Practical results appear to verify this theoretical analysis, since, for instance, No. 6 blast furnace at the South works of the Illinois Steel Co., which was designed along such lines of reasoning, and has now been in operation for about two years, has consistently worked with a more regular and uniformly lower blast pressure than the other furnaces at this plant under comparative conditions. The principle dimensions of this furnace are given in Fig. 1.

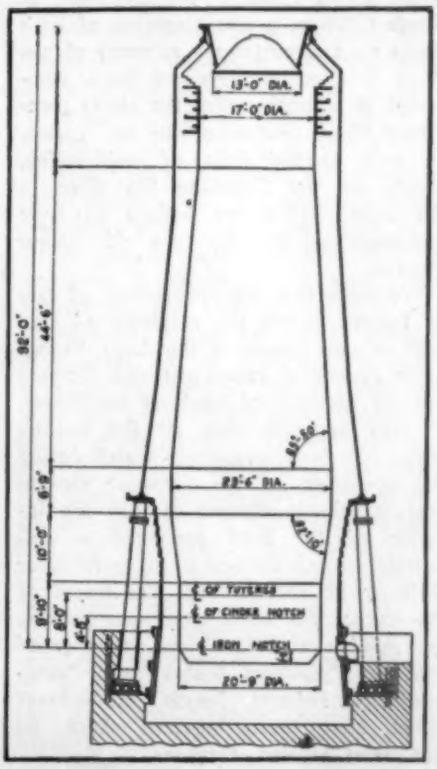


FIG. 1—DIMENSIONS OF NO 6 FURNACE, SOUTH WORKS, ILLINOIS STEEL CO.

Pressure Drop is Insignificant

One of the most frequent objections heard to a large hearth is that the furnace must necessarily suffer from lack of penetration, and that this ailment can be alleviated only by either considerably overblowing or by reducing the tuyere size to such small dimensions as to create a pronounced "jetting" action.

Advocates of this theory are, in my opinion, laboring under a wrong assumption with regard to the actual pressure drop through the tuyeres of a blast furnace. Calculations based on authoritative tests concerning the flow of air through orifices show that under average conditions of Mesaba practice this pressure drop is less than 10 per cent of the total blast pressure and this figure has been verified repeatedly by taking pressure readings on furnaces in operation. Since it is also a scientific fact that the energy of the air flow through an orifice, that is its ability to overcome resistance, or to penetrate, varies directly as the difference in pressure before and after the orifice, it readily will be seen that, other things being equal, a doubling of the penetrating ability would require only a small increase in total blast pressure. However, practice on our largest hearth furnace in South Chicago has demonstrated conclusively, I believe, that no such additional penetrating energy is required. Based on an equal volume of wind blown, it was found best to use a slightly larger tuyere area than on other furnaces with smaller hearths. The

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Abstract of a paper presented at the Oct. 21 meeting of the American Iron and Steel Institute, New York. The author, Walther Mathesius, is superintendent of blast furnaces, Illinois Steel Co., South Chicago, Ill.

FIG. 2—NEW TYPE OF BOSH PLATE WHICH AFFORDS EASY CLEANING

only possible explanation for this seems to be that the materials are not packed as tightly in the large hearth and actually offer less resistance to the blast. The latter, therefore, with the same energy, is able to penetrate for a greater radial distance than was formerly possible.

Another point which has been raised as indicating the fallacy of the large hearth design, is the fact that on many large

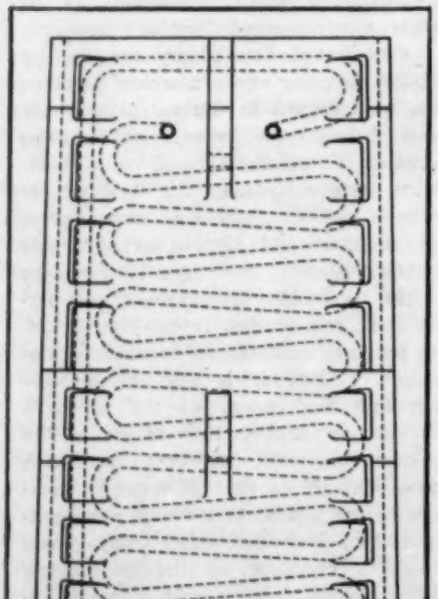


FIG. 3—COMMON TYPE OF HEARTH JACKET COOLING SEGMENT SHOWING ARRANGEMENT OF PIPE LOOPS

hearth furnaces the tuyeres, extending from 9 to 12 inches into the furnace proper, are longer than those in use at other plants. The assertion has even been made that the "jetting" action as previously mentioned, together with the long tuyeres, produces "phantom" boshes, the actual working lines of the furnace having a much flatter bosh angle and smaller hearth than those provided in the design. I feel justified on the basis of our experience at South Chicago, to reply to these statements that we are able to use longer tuyeres to good advantage, and do so on furnaces with hearth diameters ranging from 17 feet 8 inches to 20 feet 9 inches, on account of our steep and low boshes. Without these, shorter tuyeres would have to be used in an attempt to keep the bosh clean and prevent the formation of accumulations, the periodical building up and sliding off of which was formerly a source of continuous trouble at many plants.

A bosh in this condition becomes, of course, still harder to keep clean, as the erosion has produced a series of shelves which have justly been called "ideal lodging places for scaffold formations." Troubles resulting therefrom have at times been charged to overcooling of the bosh and warning notes have been voiced against the disadvantages of this evil. While I fully believe that overcooling is disadvantageous, I do not think that a decrease in the number of bosh plates used and a corresponding increase in the size of the unprotected areas between such plates is the proper remedy. We are using, at South Chicago, a closer spacing of bosh plates than is customary at many plants. With this construction we have eliminated to a large extent the above mentioned shelf formation due to erosion, as well as the evils of overcooling, simply by not "working too close to the bosh." This, we believe to have accomplished by the use of longer tuyeres.

We have had the opportunity of late to inspect during the repairing of several of our furnaces the bosh linings after successful campaigns and blowing out on account of business conditions. It was apparent that all the cooling plates had been completely coated during the operation of the furnace; erosion was practically absent, so that the interior of the bosh presented a uniformly smooth surface which could offer little or no resistance to the travel of the stock. The same inspections have in my opinion also furnished ample proof that the "phantom boshes" and "automatically reduced hearth dimensions" which have been theorized about, do not exist in our furnaces.

It has been asserted also that with an increase in hearth diameter it would

FIG. 4—COMMON DESIGN OF BAFFLE PLATE FOR BOSH COOLING

be necessary to add to the number of tuyeres in order to avoid too great a distance between the same, since this would lead to the formation of pilasters of inactive material and an undesirable reduction of hearth area. In reply I can only state that on four of our furnaces at South Chicago, where the distance between the centers of adjoining tuyeres, measured on the periphery of the hearth, was 4 feet 7¼ inches, 4 feet

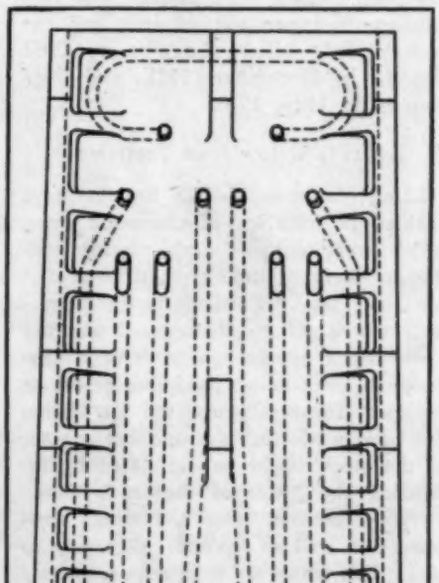


FIG. 5—NEW DESIGN OF HEARTH JACKET COOLING SEGMENT WITH HAIR PIN LOOPS OF PIPE

11¾ inches, 5 feet 9¾ inches and 5 feet 10⅝ inches, inspection after blowing out did not show any such formations. On our No. 6 furnace, where with 20¾-foot hearth diameter and 10 tuyeres, the distance between tuyeres being 6 feet 6¼ inches, we do not expect to have an opportunity for inspection for some time to come. I feel justified in stating that the operation of this furnace does not reveal any indications of forming such accumulations between tuyeres.

Large Hearths Suited for Foundry Iron

Another statement which has been made freely is that large hearths are not capable of maximum heat concentration and for this reason a poor quality of fuel would here be more likely to give serious trouble through building up in the bottom than would be the case with smaller hearth dimensions. For the same reason large hearths were said not to be as well suited for the manufacture of foundry iron and other high-silicon grades. So far, I have not been able to find a satisfactory explanation or theory as to how a small hearth favors maximum heat concentration..

In summing up these arguments I do not intend to deny that conditions may exist in this country—and they are known to predominate abroad—where in normal operation furnaces with high or flat boshes and small hearth dimensions work entirely satisfactory and compare well in results with those accomplished in Mesaba practice by furnaces with larger hearths. The fact remains, however, that in a great number of instances, and under different conditions of raw materials, practice and products, the larger hearth has been the means of obtaining improvements in output and economy, which were not realized before. So far I am not aware of any proven case where large hearths failed to produce results which could be obtained with smaller diameters. As long as such proof is not furnished the large hearth may rightfully continue to claim its supremacy.

Some Advantages of Large Hearths

The enlargement of the various hearths at South works has not imposed additional or increased stresses and duties. In some respects the demands upon the strength and wearing qualities of the construction have actually lessened. The volume for storing the molten iron and slag being larger, the maximum height to which these latter will rise above the low level prevailing at the end of the cast, must for a given production necessarily be lower. Thus, less pressure is exerted per square foot of bottom and hearth walls, and there is less danger of metal reaching the level of the cinder notch or of slag interfering with the combustion of coke at the tuyere level. Such advantages are distinctly to the credit of the large hearth, as they could not have been obtained by increasing the vertical distances between the iron and cinder notches and the tuyere level. These dimensions must necessarily be kept below a well defined maximum, otherwise the metal bath being removed too far from the zone of highest temperature, becomes the cause of producing physically cold iron, which is the source of many evils and worries in steelworks as well as blast furnace practice.

To obviate breakouts requires—aside from highest quality of building materials and first class workmanship—uninterrupted, effective water cooling and ample mechanical strength. The latter should preferably be provided in such a way that a possible failure of the

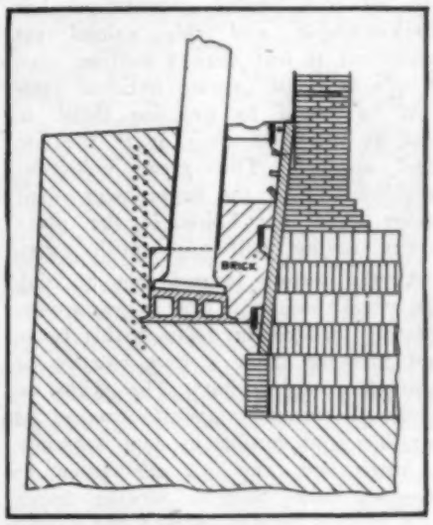


FIG. 6—HEARTH JACKET IS REINFORCED BY A GIRDLE OF CONCRETE AND FIRE BRICK

former at any one point with resultant local heating and perhaps an incipient breakout, will not at the same time reduce the strength of the mechanical bond. It is apparent that this might readily be the case where cast iron water-cooled staves are placed immediately inside of a steel hearth jacket or where water-cooled hearth jacket sections are encircled by bands placed directly on the jacket. To eliminate this risk we have developed a design which has been in use for several years and consists mainly of a substantial circular beam of reinforced concrete placed at some distance from the water-cooled, cast iron hearth jacket, as shown in Fig. 6. The space between this concrete reinforcement and the hearth jacket is bricked up with fire brick, so that any radial pressure exerted on the hearth jacket, or expansion stresses of the latter, are directly transmitted to the concrete girdle. Provision is made by allowing clearance on the furnace side of each column, that no side thrust can be transmitted to them.

In order to reduce the chances of interruption in the cooling of the hearth jacket segments, we have abandoned the rather conventional design as shown in Fig. 3, because it was found impossible at times to remove obstructions carried in with the water from the many bends and angles of the cast-in cooling pipes. In its place we now are substituting the type shown in Fig. 5. It will be seen that only simple hair-pin loops of pipe are used in this design, so that in case of stoppage each pipe is accessible from the outside for practically its entire length. Also, should it be found impossible to remove an obstruction from one of the loops, it is no longer necessary, as before, to discontinue cooling the entire section.

New Design Replaces Bosh Plate

Following similar lines of reasoning, we are replacing the bosh plate design as shown in Fig. 4, by that shown in Fig. 2. As may be seen, the latter type of plate readily is accessible for cleaning out, when required, by removing the pipe plugs provided for this purpose. Accumulations of solid matter, which if permitted to remain would interfere with the cooling effect and eventually lead to the destruction of such plates, may be readily removed during operation. Furthermore, these plates have the advantage of a positively controlled flow of water, no core holes being required in the baffle plates such as generally are found in the older designs, where they permit of by-passing the water around the outside edge of the plate and of depositing solid matter in the remaining passages in which the flow of water is decreased correspondingly.

It should be noted also that in the new design the baffling of the plate is arranged parallel to, instead of at right angles to the line of withdrawal from the brickwork. This type of construction effectively supports the arched surface and prevents indentations, which formerly interfered with the removal of the plates from the brickwork.

The successful development of the large hearth blast furnace, unhampered as far as I am aware, by any sacrifice of former advantages, is an exclusively American accomplishment, which today is evoking the keenest interest of our competitors abroad. The results obtained so far justify the belief that permanent progress has been achieved to the last benefit of the American iron and steel industry.

DesMoines Foundry & Machine Co., DesMoines, Ia., C. W. Schmidt, manager, is just beginning production in its new foundry plant.

Big Users Must Save Coal First

Fuel Economy, Although a National Problem, Largely Devolves Upon Industries with Great Resources of Capital—Central Power Stations Will Conserve Mineral Supply—Steel Industry Already Highly Electrified

BY GEORGE OTIS SMITH

COAL is the shortest word to express industrial power and domestic comfort. Even the rumor of a coal shortage simply demonstrates this fuel is in reality the staff of life to the industrial world, and the temporary stoppage of any of the larger sources of supply threatens a nation-wide crisis. Shut down the coal mines, and the country becomes not only cold but idle and hungry.

The figures of this country's total coal resources, millions of millions of tons, or even the few hundred million tons of the annual output, are too large to be grasped, and it becomes necessary to express the facts in smaller quantities. Roughly speaking, 1000 tons of coal is what a mine worker mines in a year, the measure of what he contributes to the world's work and well-being. This human measure of 1000 tons also has the advantage of being easily visualized as a short train load of 20 cars of coal on its way to serve the varied needs of the consumer.

Broadly stated, the largest use of coal is in furnishing motive power and heat for the industries and public utilities, 350 tons out of every 1000 tons mined going to the boiler house factory, mill, shop, or power plant. But next to these seven carloads distributed throughout the country are five cars, or 250 tons, of coal which the railroads need for their own use. Domestic demand comes next, 165 tons out of each 1000 being used for heating and cooking. Coke ovens require nearly as much as the homes, or 130 tons; and the balance of the miner's contribution includes the coal for export and bunker use, 60 tons; 35 tons used in operating the mines themselves, which of course does not make up a part of our train load; and 10 tons which go to the gas works.

Even in this simple analysis of the uses of coal, it would be difficult to establish any rigid scheme of priorities; coal absolutely is needed for each of these uses, and this nation-wide dependence upon coal is so evident as to demand general attention to the subject of thrift in coal. Every citizen should do his part in making the best use of coal, but the responsibility of leadership in economy may with justice be placed upon the larger users.

The steel industry required in 1918 about 100,000,000 tons of coal, slightly more than two-thirds of it in the form of coke. So in dependence upon coal, this industry stands next to the railroads. At the bottom of the list of uses of coal, stated quantitatively, is blacksmithing, and this annual requirement is less than a million tons. Where is it of greater national concern to begin to practice thrift in coal, at the little shop or at the big steel works? The great industrial establishment or the superpower plant rather than the home is the place where saving will accomplish most.

As the second largest user of coal, the steel industry can most appropriately lead off in defining this issue, and meeting it in a way worthy of American engineering. The scale on which the industry operates makes its possible contribution in coal economy a large one, and its experience in stopping leaks and in turning losses into profits simply justifies the nation in putting the question: Is the American Iron and Steel institute, with its splendid equipment of engineering and financial talent, as well as its unparalleled command of capital, doing all it can with the 100,000,000 tons of coal its members receive each year?

Of the ton of coal in place, where Nature stored it for the use of man, the amount converted into mechanical energy, under the average practice of today is only 76 pounds! This general indictment of "average practice" makes the question of thrift in coal a national rather than an individual problem. The proportion of coal left underground is a sad commentary on the general appreciation of the value of coal, and the margin between high recovery, which may be stated at 95 per cent, and the average recovery of 70 per cent or less shows to what extent coal still is wasted at one place alone and where the world does not see the waste.

Electrification of coal mines is gradually coming, with gratifying results in efficiency of operation and economy of fuel. In the mines of Logan county, W. Va., the saving in coal effected by supplying power from a central station has been estimated at 50 to 75 per cent, and the experience of the Lehigh Coal & Navigation Co. at its Rahn colliery is no less satisfactory. It is wholly conservative to figure that 50 per cent of coal now used in mine operation can be saved by simply extending electrification from central stations.

Another measure of coal waste in the generation of power, even where the conditions promoting efficiency are much more favorable, is afforded by the records of the public utility plants of Massachusetts. Last June the average coal consumption in all these plants was 2.29 pounds per kilowatt-hour, but at the largest plant of the largest company the average was 1.8 pounds, a saving of more than 20 per cent, the difference between best practice and average practice.

With all the marvelous record of industrial progress in the United States, industrial knowledge is far ahead of its practice. It is not necessary to adopt untried theories in winning larger values from coal. The first step is simply to lift average practice up to the level of the best practice. Industry should feel the pull of its most progressive units. Take, for example, the possible coal saving by the Massachusetts public utilities; if their average efficiency should be raised only to the standard achieved by the largest company, the result would be nearly a third of a million tons less coal needed each year by these plants.

Still more striking is the evidence which can show the coal saving possible through the larger use of electricity as the agency in applying the energy in coal to the aid of human labor. Again it is proper to note in advance that the steel industry is already motor-driven as probably no other industry is. The motors used by the industry aggregate nearly one-third of the power of all the motors installed in the United States. Statistics show that the average steam plant uses eight times as much coal as is necessary in the largest central stations. If to this initial saving of 7 pounds of coal out of 8 at the elec-

From a paper, "Thrift in Coal," read by Mr. Smith before the American Iron and Steel Institute in New York, Oct. 22, 1920. Mr. Smith is director of the United States geological survey.

tric power station are added the possible savings on the railroad and the mine, the ratio between present average practice and present best practice becomes nearly 12 to 1. Even if this indictment of waste is discounted one-half, power users stand convicted of almost criminal negligence, for cheap power and plenty of it provides the only way to retain America's industrial leadership.

The big electric station, with its modern steam turbine equipment, uses along with 600 pounds of coal which contains heat units equivalent to 1000 horsepower-hours, another 500 pounds from which it derives no return. This seems wasteful enough, but the little steam plant, with its poor load factor as well as much less efficient equipment, wastes 9400 pounds for every 600 pounds it really utilizes, nearly a 16 to 1 ratio in favor of the big plant. If railroads and mines were electrified 120 pounds of coal would mine and bring to the big plant the coal burned in generating 1000 horsepower-hours, instead of the 5700 pounds now actually required in serving the average steam plant.

The use of coal in America for making coke dates back some 80 years, but the operation of by-product ovens covers only one-third of that period, and only last year did the output of by-product coke first equal that of beehive. The field is divided between the old and the new practice, but two advantages of the by-product ovens over the beehive ovens alone show how much the full substitution will mean to the country. First, the yield of coke in the by-product ovens compared with that in the beehive ovens is 23 to 25 per cent greater with the low volatile coals and 7 to 8 per cent greater even with high volatile coal; and second, the recovery of 7 to 15 gallons of tar, benzol, toluol, and other oils; 16 to 30 pounds of sulphate of ammonia, and the surplus gas constitutes a great resource in itself.

By its very name the by-product practice suggests not only saving rather than waste but the lower cost of the chief product thereby made possible. The experience of the leading producer of metallurgical by-product coke affords conclusive evidence that in the Pittsburgh district this coke can be furnished to the furnace at so much lower cost than the beehive coke as to give an ample return on the large investment required. It is very profitable to save the by-products, yet beehive ovens have been within the reach of operators who had relatively little capital, whereas a modern by-product plant on an efficient scale involves an investment of many millions. Conservation of the full value of coal is not a poor man's proposition.

Already fuel economy has reached so high a mark in the largest steel plants that the present practice gives gratifying results. The waste gases from the blast furnaces are used in engines to blow the furnaces and generate electricity to meet the extensive demand throughout the works. But to picture the extension of this thrift as planning on a national scale demands, some conditions must be supplied which are not yet realized. This use of coal first as a raw material and next only in part as a fuel means the extension of by-product practice until in no home or public building or factory will raw coal be used for fuel.

The fact that more than half of the world's coal reserves are believed to lie within the territory of the United States has led too many into unwarranted optimism. The captains of the great industries concentrated along the Atlantic seaboard, will do well to think less of the millions of millions of tons of coal that are said to lie awaiting their need in various parts of this country, but rather to ask for details as to where this coal is and how available it is for the use of this and the next generation. The Pittsburgh bed in Pennsylvania was estimated 40 years ago as good for 30 generations, but the rate of mining has so greatly increased that now this bed must be measured by the span of a single generation. In the Georges Creek field in Maryland this same bed, there called the "big vein" was believed 40 years ago to have a life of at least 150 years, but today the field is regarded as almost worked out.

Operators and consumers must figure on increasing costs in the future, due to greater depth and longer hauls to market. This is another reason for delaying the exhaustion of the eastern coal fields by making full use of the coal now being mined.

Fuel, for both industrial and domestic use, is in active demand in other parts of the world, particularly southern Europe and South America, and even a cursory review of the coal reserves of the world will show this demand is not simply a symptom of the present reconstruction period; the fuel shortage in several large and populous countries is chronic. The export of mineral fuel is therefore to be regarded as an obvious duty if America is to be a good neighbor. The picture of the better days here at home with full utilization of the coal showed the homes supplied with coke, which will furnish the needed heat units without the loss of the other valuable constituents. Should America not, then, expect coke rather than coal, giving to the people of South America and southern Europe the fuel they need but reserving for the home industries the other contents of the coal?

That the future prosperity of the nation will be defined largely in terms of fuel and power does not require demonstration so much as it deserves emphasis. No better illustrations of the use of machinery to multiply man power can be found than in the steel industry; visit a modern plate mill, with its full equipment of electric drive, and one will find there 5¼ horsepower in electric current to every workman; watch the marvels of a self-contained tube plant, where red dirt is transformed into every kind of steel pipe and tube, and there nearly 6½ horsepower of electric energy backs up the human worker; and so also in the rail mill or the wire mill, where 10 horsepower is a common measure of the co-operation of the machine with the man, and in times of forced output this may rise even to 13 horsepower, the electric drive carrying more than its share of the extra load.

Fuel economy, then, is pre-eminently a problem for large units, because here thrift can yield largest results. In power generation it is the largest central stations that afford the figures for best practice, and such stations, like the largest by-product coke plants, involve capital expenditures of tens of millions of dollars. Economy in the use of natural resources, whether oil, coal, or water power, requires large capital outlay, yet the savings are great enough to invite just such investments.

The large benefits coming in the future from this present saving of resources will be national and shared by all citizens; and likewise the public of this day and generation should share in the advantages of reduced fuel costs made possible by betterment of practice. It is well, however, to think over the old truth in the parable of the pounds, where the reward was on a sliding scale referred to the service rendered. Today the individual or corporation which makes 1 ton of coal do the work formerly done by eight, surely deserves a larger profit than that which uses four tons or even two tons to achieve the same result, although it is equally plain that the consumer of the manufactured product should no longer pay on the old basis of 8-ton practice. The national concern is first and chiefly in securing the largest possible coal saving.

Late News of the Societies

Notes on Past and Coming Meetings of National and Local Trade and Technical Organizations

DURING the annual meeting of the American Society of Mechanical Engineers, Dec. 7-10, particular emphasis will be given the subject of transportation, according to the tentative program recently announced by the organization. The phases of transportation which will be discussed include railways, waterways, feeders, motor trucks, and terminal problems in New York. The program of both the general and special sessions is as follows:

FUELS—Fuel Supply of World, L. P. Breckenridge; Low Temperature Distillation of Coal, O. P. Hood; Fuel Conservation versus Money Conservation, D. M. Myers; Form Value of Energy in Relation to Its Production, Transportation and Application, Chester G. Gilbert, Joseph E. Pogue.

MACHINE SHOP—Side Cutting of Thread Milling Hobs, Earl Buckingham.

MANAGEMENT—The Life and Work of the Late Henry L. Gantt; Mr. Gantt's Contribution to Industry, Fred J. Miller, president, A. S. M. E.; Mr. Gantt's Contribution to Shipbuilding, Ship Operation, Ordnance and Aircraft, Marshall Evans; The Culmination of Mr. Gantt's Work, E. A. Lucey; An Appreciation from France, M. Ch. de Freminville; An Appreciation from Great Britain, James J. Butterworth; Mr. Gantt's Industrial Philosophy, W. N. Polakov.

RAILROAD—Static Adjustment of Trucks on Curves, R. Eksergian; Increasing Capacity of Old Locomotives, C. B. Smith; Modernizing Locomotive Terminals, George W. Rink.

TEXTILE—Humidity Control in Textile Plants, author to be announced; Power Application to Finishing Plants, Leo Loeb; Textile Fabrication for Mechanical Purposes, J. W. Cox; Ventilation of Dye Houses, D. W. Andrews.

POWER—Session devoted to Consideration of Future Development of Power.

WOODWORKING—Engineering in Furniture Manufacture, B. A. Parks; Use of Wood for Freight Cars, H. S. Sackett; Woodworking Education, F. F. Moon; Wooden Hollow Ware, John L. Graham; Wooden Factory Flooring, L. T. Erickson; Wood Preservation, E. S. Park, J. M. Webber; Electrically Operated Saw Mills, A. B. Hall.

RESEARCH—Calibration of Nozzles for the Measurements of Air Flowing Into a Vacuum, William L. de Baufre; The Heat Insulating Properties of Cork and Lith Board, A. A. Potter, J. P. Calderwood, A. S. Mack, L. S. Hobbs; The Flow of Fluids Through Pipe Lines and the Effect of Pipe Line Fittings, D. E. Foster; Steam Formulae, R. C. H. Heck.

DESIGN—Disastrous Experiences with Large Center-Crank Shafts, Louis Illmer; Tests of Truck Rear Axle Worm Drive, K. Heindhofer; Foundations for Machinery, N. W. Akimoff.

MISCELLANEOUS—The Constitution and Properties of Boiler Tubes, A. E. White; Armor Plate and Gun Forging Plant of the U. S. Navy Department at Charleston, W. Va., Roger W. Freeman.

* * *

Announce Meetings for Year.

A bulletin announcing the meetings and papers for the season of 1920-21 has been published by tht Philadelphia section of the Association of Iron Steel Electrical Engineers. The subject for Nov. 6 is "Electric Heat Treatment." It will be presented by George P. Mills, Electric Furnace Construction Co., Philadelphia; J. R. Bower, American Car & Foundry Co., Berwick, Pa., and James E. Wilson, Treadwell Engineering Co., Easton, Pa. On Dec. 4 the instruction in the care use and inspection of flexible steel cables will be discussed by H. C. Boynton and W. Voightlander, John A. Roebling's Sons Co., Treaton, N. J. P. T. Vanderwart, New Jersey Zinc Co. of Pennsylvania, Palmerton, Pa., will speak on "Power Factor Correction and Its Relation to Plant Operation," on Jan. 8. G. E. Stoltz, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will present a paper Feb. 5 reviewing the cost of rolling steel in various mills. On March 5, E. D. Sibley, Metropolitan Edison Co., Reading Pa., will speak on "Methods Used to insure Continuity of Service." On April 4, D. M. Petty, Bethlehem Steel Co., Bethlehem, Pa., will discuss the generation of power in steel mills. The meeting on May 2 will be devoted to general ideas and discussion pertaining to the application of electricity to the iron and steel industry. All meetings will be held in the Engineers club, 1315 Spruce St., and will start promptly at 8 o'clock.

* * *

Pittsburgh Foundrymen Meet

Round table discussion of the convention of the American Foundrymen's association at Columbus, O., was indulged in Tuesday evening Oct. 19, at the regular monthly meeting of the Pittsburgh Foundrymen's association at the Chatham hotel. Among those who spoke were Carlton S. Koch, of the Fort Pitt Steel Casting Co., retiring president of the American Foundrymen's association; Samuel Sleeth, of the Westinghouse Airbrake Co.; C. H. Gale, of the Pressed Steel Car Co.; F. H. Clay of the Allegheny Steel Co., A. D. Frohman of the S. Obermayer Co.; L. B. Snow of Hickman, Williams & Co., and J. S. McCormick of the J. S. McCormick Co.

To indicate the growth of the American Foundrymen's association, Mr. Koch pointed out that during the past year its membership had increased 49.8 per cent. He urged the importance of research work and of foundrymen becoming thorough in knowledge of their trade.

Necessity of the Pittsburgh Foundrymen's association in stimulating more interest in its work and of getting a larger and more active membership was emphasized by Mr. Frohman. He suggested that interest from the trustee's fund be used to provide a prize to any coremaker, molder, patternmaker or foundryman for research work to advance the industry. Mr. Snow suggested a prize for the best papers on subjects vital to the industry and said this would be a means of interesting young men in the association and its work. Others made suggestions also for awards for research work.

* * *

Discusses Modern Power Plants

Vice President I. W. McConnel, of Dwight P. Robinson & Co., Inc., gave a talk on "The Modern Power Plant," illustrated by lantern slides before the regular monthly meeting of the Engineers' club, of the Youngstown, O., district. The meeting which was held at the club rooms, Park Theater building, Oct. 26, was largely attended. After the business meeting, Joseph L. Wheeler, librarian, explained the tax levy to be voted upon at the November election and its effect on the city library.

* * *

Will Discuss Oil Problems

International as well as national aspects of the petroleum problem will be discussed at the next annual meeting of the American Petroleum institute, to be held in Washington, Nov. 17-19. Petroleum representatives of 21 foreign governments have been invited to attend. Transportation, taxation, research and statistics are four of the topics to be discussed.

Convention Calendar

Oct. 27-28—Refractories Manufacturers' association. Convention at White Sulphur Springs, W. Va.

Nov. 10-12—Society of Industrial Engineers, Pittsburgh. S. T. A. Loftis, 327 South LaSalle street, is secretary.

Nov. 11-12—National Tool Builders' association, dates for fall convention advanced from Dec. 2 and 3.

Nov. 12—American Association of Engineers. Conference on employment and education, Congress hotel, Chicago. The headquarters of the association are at 63 E. Adams street, Chicago.

Nov. 17-18—National Founders' association. Annual convention, Hotel Astor, New York. J. M. Taylor, 29 S. La Salle street, Chicago, is secretary.

Dec. 7-10—American Society of Mechanical Engineers, New York. Forty-first annual meeting. Engineering Society building, New York. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary.

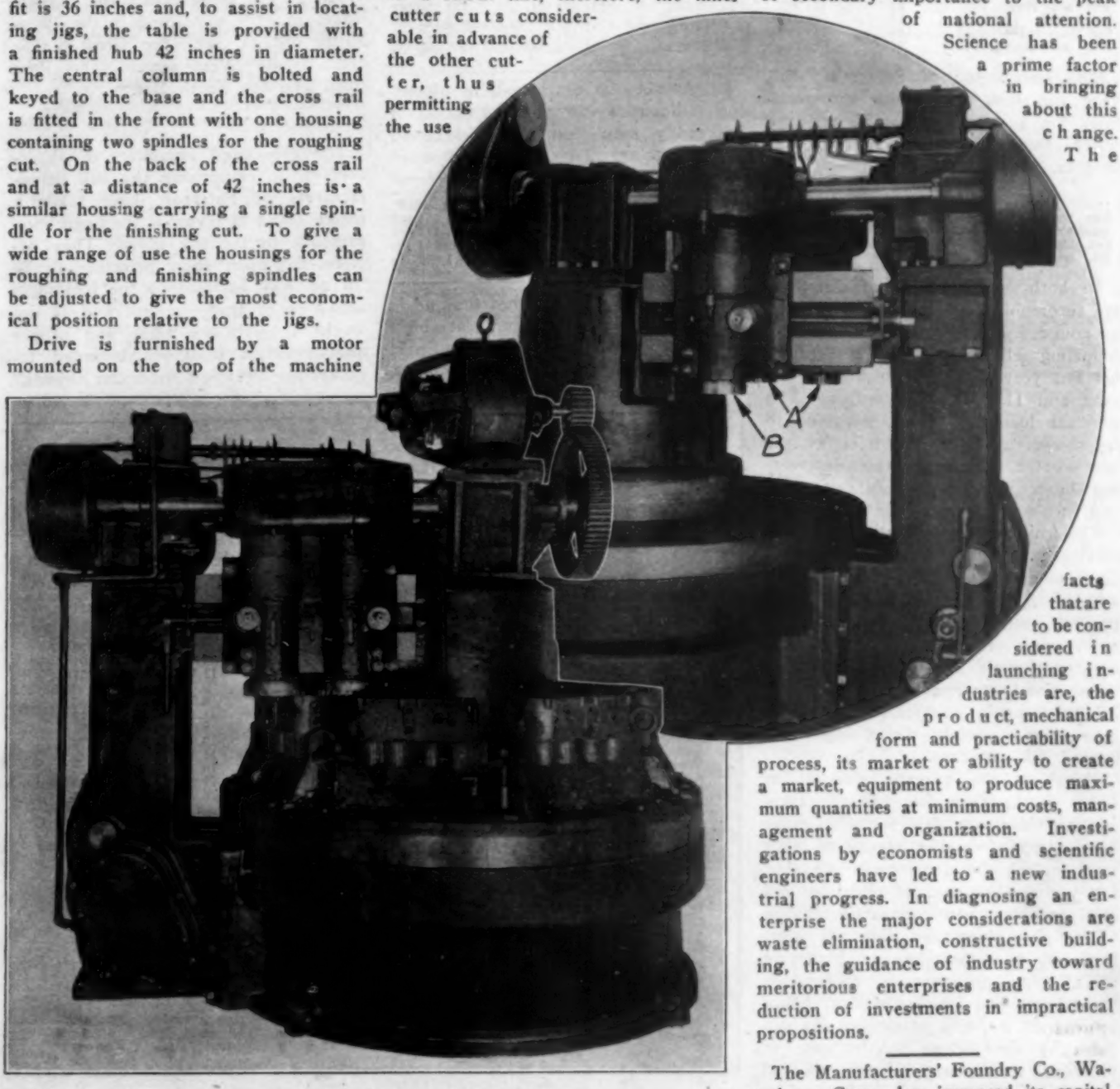
Continuous Miller Has Rugged Construction

Extreme ruggedness and the ability to absorb and dissipate vibration are two features of a new ring table type of continuous milling machine, manufactured by the Newton Machine Tool Works, Inc., Philadelphia. As shown in the accompanying illustrations the table casting is fitted to the central taper column of the base and is provided with an annular bearing close to the periphery of the table. To give rigidity, the cross rail and central upright are made in one piece. Diameter of the table is 84 inches and the depth from the annular bearing to the top of the table 12 inches.

Between the base column and the table the least diameter of the taper fit is 36 inches and, to assist in locating jigs, the table is provided with a finished hub 42 inches in diameter. The central column is bolted and keyed to the base and the cross rail is fitted in the front with one housing containing two spindles for the roughing cut. On the back of the cross rail and at a distance of 42 inches is a similar housing carrying a single spindle for the finishing cut. To give a wide range of use the housings for the roughing and finishing spindles can be adjusted to give the most economical position relative to the jigs.

Drive is furnished by a motor mounted on the top of the machine and geared to a jackshaft which transmits the motion to the spindles and is also equipped with a device for regulating the speed of the spindles independently of each other. The rotative movement of the table is controlled by a fixed feed so protected that only proper authorities can change the rate of the rotation. Each of the spindles are provided with individual adjustment for setting the cutters to gages. With the distance of 42 inches from the center of the roughing cutters to the center of the finishing cutters, the roughing operation is completed before the finishing operation is started.

Another feature of the machine is that the inner or righthand roughing cutter is further advanced than the left-hand cutter. The cutters are not on a radial line, therefore, the inner cutter cuts considerable in advance of the other cutter, thus permitting the use of a head with 14-inch centers equipped with 12-inch cutters to cover a surface completely. All bearings, except the spindle bearings, are oiled by cascade method of lubrication, the oil being pumped from a reservoir in the outer upright to the box on top of the machine from which point it is distributed.



SIDE VIEW OF NEW CONTINUOUS MILLING MACHINE. (INSET) CLOSEUP VIEW OF SPINDLES. FINISHING SPINDLES ARE DENOTED BY *A* AND ROUGHING SPINDLE BY *B*

Discusses Launching of New Industries

Modern industry's development represents the sum total of our civilization, is the opinion of M. H. Avram & Co., Inc., New York, contained in a booklet explaining science in industry. According to the booklet manufacturing has risen from a position of secondary importance to the peak of national attention. Science has been a prime factor in bringing about this change. The facts that are to be considered in launching industries are, the product, mechanical form and practicability of process, its market or ability to create a market, equipment to produce maximum quantities at minimum costs, management and organization. Investigations by economists and scientific engineers have led to a new industrial progress. In diagnosing an enterprise the major considerations are waste elimination, constructive building, the guidance of industry toward meritorious enterprises and the reduction of investments in impractical propositions.

The Manufacturers' Foundry Co., Waterbury, Conn., has increased its capital stock from $200,000 to $400,000.

Employment Still Shows Decline

Ten Out of Fourteen Industries Reported Fewer on Payrolls in September Than in August—Iron and Steel Employes, However, Increase 2.3 Per Cent—Bureau of Labor Statistics Issues Data on Wages

WASHINGTON, Oct. 26.—Out of 14 selected industries, 10 in September were employing fewer persons than in August, while nine were employing fewer than in September one year ago, department of labor statistics show. The following comparison of September with August, the period taken by the automobile industry is one week, and for the others a half month:

	Establishments reporting	Number on payrolls—Sept., 1920	Number on payrolls—Aug., 1920	Amount of payrolls—Sept., 1920	Amount of payrolls—Aug., 1920
Iron and steel	98	184,805	130,564	$14,392,181	$13,536,181
Automobiles	46	115,253	120,624	4,035,198	4,169,360
Car bldg. and repairing	38	47,195	49,329	3,467,664	3,747,901
Bit. coal mining	80	20,706	20,283	1,655,158	1,491,108

The comparison of September this year and last, again with automobobiles for a one-week period and the other three industries for a half months, is:

	Establishments reporting	Number on payrolls—Sept., 1920	Number on payrolls—Sept., 1919	Amount of payrolls—Sept., 1920	Amount of payrolls—Sept., 1919
Iron and steel	107	184,411	176,530	$14,298,619	$11,754,158
Automobiles	45	128,997	139,754	4,455,590	4,174,902
Car bldg. and repairing	40	49,528	38,370	3,637,792	2,242,482
Bit. coal mining	67	17,284	18,398	1,392,762	1,068,314

In both comparisons the slump in the automobile industry is shown to be pronounced. Employes in the plants reporting fell from 139,754 in September last year to 120,624 in August this year and 115,253 in September. The greatest losses, however, continue to be shown in such industries as the silk, woolen, cotton manufacturing, cotton finishing, leather, boots and shoes and men's clothing.

The iron and steel plants which had previously reported claimed larger forces in September than in both August, and in September, 1919. September payrolls, when compared with those of August, reflected the same decreases though in lesser degree.

Iron and steel employes increased 2.3 per cent in number in September over August, while their wages advanced 6.3 per cent.

Data on the average number of hours worked per day and the average earnings per day for 1919 have been compiled by the bureau of labor statistics of the department of labor for various branches of the iron and steel industry. In the accompanying tables are given the data on blast furnaces, open hearths and blooming mills. For purposes of comparison the bureau has taken the total hours worked in a 7-day week and divided them by six. Thus, in the case of blowers, the average hours worked per week day was found to be 11.6. This means that the average blower was found in 1919 to be working 69.6 hours per 7-day week, and it may be that in some cases a 6-day week was worked and in others a 7-day week. The lowest wage paid to blast furnace workers was 36.1 cents per hour, and the highest 75 cents. The wage range at the open-hearths was from 31.4 cents to 96 cents, and in blooming mills from 46.9 cents to $1.35. It is readily seen that the average of hours was greater at blast furnace plants than at the open hearths and in blooming mills. Laborers at blast furnace plants last year were paid on an average of 45.5 cents per hour, those at the open hearths 46.4 cents and in blooming mills 46.9 cents.

In the survey of bessemer converter plants the highest paid workmen were found to be the vessel men who averaged $1.10 per hour in 1919, while the lowest wage, an average of 48.9 cents per hour, was paid to laborers. In compiling its data, the burden of labor statistics divided the country into four districts, Pittsburgh, eastern, southern and Great Lakes and Middle West. As a general rule the highest wages in 1919 were paid in the Pittsburgh district, with the Great Lakes and Middle West second, the East third and the South last.

The associated industries of Paterson, N. J., comprising the silk manufacturers of Paterson, have taken a united stand in favor of the open shop principle in the silk mills. They declare the open shop principle to be "in no way harmful to the legitimate activities of trade unions, and is not a check upon the right and proper affiliations of workmen bounded together for legal and American objects."

Average Hours Worked and Earnings in Iron and Steel Industry in 1919

	Number of establishments	Number of employes	Av. hours worked per week day	Av. earnings per hour worked
BLAST FURNACES				
Blowers	23	118	11.6	$0.75
Blowing engineers	23	145	11.1	.624
Blowing engineers' assistants	16	126	9.6	.562
Bottom fillers	4	72	12.7	.436
Cinder men	20	291	10.1	.472
Iron handlers and loaders	4	94	9.3	.361
Keepers	23	195	11.4	.557
Keepers' helpers	23	622	9.7	.470
Laborers	23	2131	8.5	.455
Lagy men	20	306	11.1	.516
Larry men's helpers	17	290	9.8	.491
Pig-machine men	18	372	10.0	.476
Skip operators	18	157	11.8	.535
Stockers	20	988	10.1	.464
Stove tenders	23	192	11.4	.523
Top fillers	4	28	10.2	.468
OPEN-HEARTH FURNACES				
Door operators	16	174	9.4	$0.314
Charging machine operators	19	107	10.7	.763
Loco. engineers	18	151	10.0	.675
Ingot strippers	17	56	10.5	.729
Laborers	19	1763	8.4	.464
Ladle cranemen	19	129	10.6	.736
Melters' helpers, third	19	582	9.2	.546
Mold cappers	12	92	10.2	.592
Steel pourers	19	78	10.2	.781
Stock cranemen	17	120	10.4	.574
Stockers	18	469	10.6	.501
Stopper setters	10	48	8.5	.663
Switchmen	18	176	10.0	.554
Melters' helpers, first	19	412	9.8	.969
Melters' helpers, second	19	430	9.2	.695

Bounty on Iron Ore

Production in Canada Urged by Boards of Trade—Commissions Hear Case

Toronto, Ont., Oct. 23.—The tariff commission met in Ft. William, Ont., recently when memorials were inscribed by the Port Arthur and Ft. William boards of trade, urging the payment of a bounty on Canadian iron ore as a means of developing the iron mining industry. The Port Arthur board suggested a bounty of 50 cents per ton for a period of 15 years, while the representatives of the Ft. William board said a bounty of less than $1 per ton would not be effective.

All agreed that the bounty should be paid to the producer of the ore and not to the smelters, pointing out the failure of former attempts to encourage the iron mining industry by such means.

Dr. Marion, member of parliament, said there could be no harm in trying the bounty project. If it fails the country would be put to no loss. J. E. Marks, who was the principal spokesman for Port Arthur, urged the granting of a bounty on national grounds presenting statistics showing the extent and importance of the iron and steel industries of Canada, which are almost entirely dependent on ores imported from the United States.

The statement was made that the American merchantable ores will be exhausted in 35 years, and that exports might be prohibited at any time. Statistics were presented showing the extent of the iron ore resources available for the supply of a great iron industry in the Port Arthur distirct.

Sir Henry Drayton, chairman of the commission, maintained a sceptical attitude. He stated that the iron industries of Canada, with a total profit of nearly $1,000,000,000, should be interested in seeing that supplies of raw material are available, and therefore should finance the bonus.

At Sault Ste. Marie where the commission met on Oct. 18, a memorial from the local board of trade was presented by J. Hussey which emphasized the desirability from a national and local standpoint of securing the development of Canadian low grade iron ores by means of bounties which should not be less than $1 per ton. President W. C. Frantz of the Algoma Steel Corp., stated that considerable development would be made if a bounty were paid.

J. G. Butler Jr., Honored

Under the auspices of its chamber of commerce, "Butler day" was celebrated by Niles, O., Oct. 23, in honor of Joseph G. Butler Jr., of Youngstown, O., who has done so much for the former city. The day was declared a half-holiday and all business houses and public offices were closed. More than 5000 people marched in a parade. The city was gayly decorated in honor of Mr. Butler who was the founder of the McKinley birthplace memorial, erected at Niles by the National McKinley Birthplace Memorial association of which he serves as president. At the celebration Mr. Butler was presented with a silver loving cup by the citizens of Niles. The celebration is to be repeated annually by the city of Niles.

To Produce Welding Gas

Production of hydrogen and oxygen gas by the electrolytic method will be undertaken at Kenosha, Wis., by the Wisconsin Oxy-Hydrogen Co., which has been incorporated with a capital stock of $150,000. Capital which has been identified with the Indiana Oxygen Co., Indianapolis, engaged in similar production, controls the new Kenosha concern. A site has been purchased in Kenosha at Marion avenue and the Chicago & Northwestern railroad tracks, and ground has been broken for a 2-story brick and concrete building, 50 x 165 feet, to be ready for machinery about Dec. 1. It is expected that the plant will be ready to start regular output by Dec. 15.

Kenosha was selected as a site for the new plant because of the fact that it is the seat of numerous large industries using gas for welding purposes.

The officers of the new concern are as follows: President, C. P. Brant; vice president, J. R. Brant; secretary and treasurer, W. G. Schoonover; general manager, W. L. Brant.

Visits Indiana Plant

The board of directors of the National Malleable Castings Co. will make its first visit to Indianapolis, Thursday, Oct. 28, to inspect its plant there and become acquainted with its personnel. In addition to the plant in this city there are three in Chicago, two in Cleveland, and one each in Toledo, O., Sharon, Pa., and St. Louis. The board of directors will visit all of these plants and while in Indianapolis will hold its monthly meeting. With the board will be its chairman, E. L. Whittemore, of Cleveland, and the president of the company, H. F. Pope, also of that city.

The Chattanooga Plow Co., Chattanooga, Tenn., will spend about $30,000 in the erection of a new building. This company is a subsidiary of the International Harvester Co.

Ammonia Declines

Fall in Nitrate of Soda Forces Sulphate to Lower Level

New York, Oct. 25.—While the market on sulphate of ammonia has been quoted at $4.40 to $4.50 f.o.b. works, these figures have been nominal, there having been practically no business, and as there have been further declines in nitrate of soda, a product highly competitive with sulphate, it is likely if little better than $3.75 to $4, f.o.b. works, could now be done. Sellers have now about given up hope that there will be any substantial buying in the near future. Fertilizer manufacturers state they have not been able to use all of the supplies already contracted for.

Although curtailment is noted in some quarters in the production of iron and steel, it has not as yet affected the output of coal tar products. Production of these products continues at the highest rate this year, it being slightly over 70 per cent of capacity. This, in conjunction with a falling off in demand, has placed sellers in a position to make nearby deliveries in virtually all materials. Naphthalene, owing to deferment in certain contract deliveries, is now more easily obtainable for nearby delivery.

No changes in prices have taken place. Pure benzol is quoted 35 to 40½ cents; 90 per cent benzol, 33 to 38½ cents; toluol, 35 to 40½ cents; solvent naphtha, 30 to 35½ cents; and naphthalene, 16 to 20 cents. These quotations are on the basis of f.o.b. works, and apply to both spot and future business. The most active trading at present is in naphthalene and solvent naphtha, paint and varnish manufacturers still covering on substantial quantities of the latter, for delivery over the next few months.

Coke Oven By-Products

Spot

Per Gallon at Producers' Plants

Pure benzol	$0.35 to .40½
Toluol	.35 to .40½
Solvent naphtha	.30 to .35½

Per Pound at Producers' Plants

Phenol	nominal
Naphthalene, flake	nominal
Naphthalene, balls	nominal

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	$3.75 to $4.00

Contract

Pure benzol	$0.35 to .40½
Toluol	.35 to .40½
Solvent naphtha	.30 to .35½

Per Pound at Producers' Plants

Phenol	nominal
Naphthalene, flake	nominal
Naphthalene, balls	nominal

Per 100 Pounds at Producers' Plants

Sulphate of ammonia	nominal

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

J. RUTLEDGE, McAlester, Okla., has been appointed superintendent of the new mining experiment station to be known as the Mississippi valley station, with headquarters at St. Louis. Metallurgy of lead and zinc and study of the ore-dressing and other problems of that part of the country are first on the program mapped out for the new station. John Gross, of Rolla, Mo., is to be in charge of the ore-dressing and milling work at the new station. Prof. Charles H. Fulton, of the Missouri School of Mines and Metallurgy, will direct the program of work on the electrothermic metallurgy of zinc. C. R. Forbes has been chosen consulting mining engineer of the bureau.

Richard Peters Jr. has resigned from Robert C. Lea & Co., Philadelphia, to become manager of sales for the Pulaski Iron Co. Rowland E. Lea will succeed Mr. Peters in the Robert C. Lea & Co. organization.

W. C. Sutherland, who formerly had charge of the Allenport, Pa., plant of the Pittsburgh Steel Products Co., has been promoted to succeed M. Wikstrom as superintendent of that plant and of the company's second plant at Monessen, Pa. Mr. Wikstrom will visit Europe to study methods used there in making seamless tubes.

Ivy L. Lee has been retained by the Pennsylvania railroad to act in an advisory capacity in matters of publicity and public relations. In the conduct of this work, Mr. Lee will report to the president and vice presidents and co-operate with the publicity department of the company. Mr. Lee formerly was executive assistant of the Pennsylvania railroad.

John P. Kelley, for 23 years associated with the A. O. Smith Corp., Milwaukee, pressed steel and drop dropped forged automotive materials, has been promoted to general sales manager, succeeding James L. Sinyard, whose duties as secretary and a director of the company demand his entire time. E. A. Barlow and C. W. Wright have been appointed assistant sales managers.

Maj. E. Holmes recently was appointed manager of the chemistry department of the National Lime association. Dr. Holmes was graduated from Indiana university in 1908 and went to Cornell university as an instructor in advanced chemistry. He became research engineer for the National Carbon Co., Cleveland, and in 1919, he returned to Cornell for research work.

Richard D. Jones, late credit manager of the Continental & Commercial National Bank, Chicago, has been elected secretary and treasurer of Briggs & Turivas, Inc., scrap iron and steel merchants, Chicago. He has a wide bank acquaintance and long training in financial matters gained during 12 years of credit experience with this bank and the Liberty National Bank of New York.

J. E. Tintsman, formerly superintendent of the Scottdale, Pa., plant of the United States Cast Iron Pipe & Foundry Co., Scottdale, has been named to succeed P. T. Laws as resident manager, Mr. Laws having been promoted to be assistant general manager of the company. Charles Seitz, formerly in charge of the company's mechanical department has been appointed superintendent to succeed Mr. Tintsman.

J. J. Beck, who recently resigned as sheet mill superintendent of the Youngstown Sheet & Tube Co., Youngstown, O., has assumed his duties as vice president in charge of mills and the galvanizing department of the Chapman-Price Steel Co., Indianapolis. Edward S. Plott, foreman of the sheet department of the Youngstown company, has been appointed general superintendent of the Chapman-Price plant.

Prof. A. E. White, one of the best known metallurgists in the country, has been installed as director of the industrial research laboratory at the University of Michigan, Ann Arbor, Mich., which now is functioning for the convenience of manufacturers of the state in solving problems of production, etc. Prof. White is president of the American Society for Steel Treaters and consultant of many plants throughout the country. The service of the new department will be paid by manufacturers as they make use of its facilities, which include practically the entire university engineering department.

W. A. Ruth, who recently resigned from the sales force of the National Car Coupler Co., has become affiliated with the Superior Steel Castings Co., Benton Harbor, Mich. His 25-year experience in the steel foundry industry has found him filling such positions as chemist, superintendent of the open-hearth department, works manager and sales manager. In his new connection he will devote considerable effort to maintenance of service and quality of castings, will aid in perfecting higher standards of production and will help to install special heat-treating and finishing processes in both the steel foundry and malleable iron units. Mr. Ruth's headquarters will be at 1550 McCormick building, Chicago, where he is available for consultation on matters of metallurgy and foundry practice on regular production and new development for general commercial and railway castings and devices.

W. H. Sanford, for many years Buffalo district manager of the American Car & Foundry Co., New York, has been appointed assistant vice president, in charge of sales in that territory. This appointment is in line with the company's policy of internal promotion. Prior to the formation of the American Car & Foundry Co., Mr. Sanford was employed by the Union Car Co. When that company was absorbed he was appointed paymaster and cashier at the Depew, N. Y., plant. In 1902 he was appointed local auditor of the Buffalo district followed by promotion to the position of resident representative. Later, in 1912, he was made district manager in charge of the Depew as well as the Buffalo plants. Mr. Sanford will be succeeded as district manager by Andrew H. Gairns now occupying a similar position with the company in Chicago. He will direct the operation of the new plant in Buffalo, which will produce all-steel cars, the foundries located in New York, and the plant at Depew. Mr. Gairns has had an extended experience in steel car work and locomotive building and is well qualified to take up these new duties.

Men of the Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

EDWIN S. CARMAN, who has just been elected president of the American Society of Mechanical Engineers, according to an announcement from the society's headquarters in New York, is secretary and chief engineer of the Osborn Mfg. Co., Cleveland, until recently known as the Cleveland-Osborn Mfg. Co. During 1919-20 he served as the president of the Cleveland Egineering society. Upon graduating from Central high school, Cleveland, Mr. Carman became connected with the Sun Oil Co., Toledo, where in 1898-99 he was instrumental in working out problems incident to the introduction of gas engines into oil field operation. From 1903 to 1909 he was chief engineer of the American Machine & Mfg. Co., manufacturer of electric traveling cranes, rolling mill and special machinery. In 1909 he severed his connection with this company to become chief engineer of the Johnson & Jennings Co., Cleveland, which position he held until he became associated with the Cleveland-Osborn Mfg. Co., in 1913. During the war Mr. Carman was interested in personnel work. Through his efforts in advocating a federation of technical organizations, he has gained promience. Several years ago he was a member of a delegation which went to New York to create interest in such an organization.

W. H. Kilpatrick, who became affiliated with the Willys-Overland Co., Toledo, last spring, has been named to take charge of production there due to the resignation of LeRoy Kramer, vice president in charge of production.

Robert R. Jenks has succeeded his father, Albert A. Jenks, as president of the Fales & Jenks Machine Co., Pawtucket, R. I. The latter continues with the company as chairman of the board of directors.

Walter C. Slade, superintendent of power and lines of the Rhode Island Co., Providence, R. I., has been elected chairman of the Providence section of the American Society of Electrical Engineers.

Dolan G. Hodges has been made head of the Hodges Boiler & Machine Works Co., recently organized at Mobile, Ala., with $50,000 capital. Robert J. Moyes is vice president, and William W. Strong, secretary and treasurer. Boilers will be the company's main product.

E. Howard Reed, vice president and general manager of the Reed & Prince Mfg. Co., and William Bacon, superintendent of the Reed-Prentice Co., both of Worcester, Mass., have been elected chairman and secretary respectively of Worcester section, American Society of Mechanical Engineers.

E. P. Bullard Jr., president of the Bullard Machine Tool Co., Bridgeport, Conn., has been awarded by the Franklin Institute of Philadelphia the Howe medal of arts and sciences for distinguished achievement in the field of mechanics by the production and perfection of automatic and multimatic machines.

John T. Chidsey, president and treasurer of the C. J. Root Co., Bristol, Conn., maker of brass hinges and automatic counting machines, has been elected president of the Bristol chamber of commerce, to succeed Charles T. Treadway. W. Kenneth Sessions, president of the Sessions Foundry Co., was elected a director for three years.

G. Schirmer has resigned his position as sales engineer in the Detroit office of the Whiting Foundry Equipment Co., Harvey, Ill., and now is associated with W. C. Bennett, industrial engineer, at 189 West Madison street, Chicago, engaging in all branches of foundry and industrial engineering, designing, superintending and equipping of complete installation.

Gordon Fox, formerly with the Fort Wayne, Ind., works of the General Electric Co., Schenectady, N. Y., and lately electrical engineer of the Mark plant of the Steel & Tube Co. of America, has become affiliated with Freyn, Brassert & Co., 645 Peoples Gas building, Chicago, engineers, in the capacity of electrical engineer. Mr. Fox is chairman of the Chicago section of the Association of Iron and Steel Electrical Engineers.

F. O. Hoagland, formerly with the Bilton Machine Tool Co., Bridgeport, Conn., who has been made general manager of the Becker Milling Machine Co., Hyde Park, Mass., and the Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., is to be elected general manager of the Reed-Prentice Co., Worcester, at the next meeting of the directors, succeeding Albert E. Newton, vice president and general manager, resigned.

R. G. Barrington, who for 15 years has been affiliated with the Cleveland Twist Drill Co., Cleveland, has been appointed Cleveland sales manager for the Reed-Prentice Co., the Becker Milling Machine Co., and the Whitcomb-Blaisdell Machine Tool Co., with headquarters at 408 Frankfort avenue, Cleveland. Prior to his Cleveland Twist Drill affiliation Mr. Barrington was identified with the Strong, Carlisle & Hammond Co., also of Cleveland.

J. J. Arnsfield, advertising manager of Fairbanks, Morse & Co., Chicago, was elected president of the Engineering Advertisers' association, Chicago, to fill the vacancy made by the resignation of A. H. Hopkins, who severed his connection with the C. F. Pease Co. to take charge of the domestic advertising division of the J. Roland Kay Co. Keith J. Evans, advertising manager of Joseph T. Ryerson & Son, Chicago, was elected vice president, and Julius Holl, advertising manager of Link-Belt Co., was elected to the board of directors to fill the vacancy made by Mr. Hopkins' retirement.

Laurance H. Hart, who recently was appointed manager of the construction department of the National Lime association, Washington, was graduated from Ohio State university in civil engineering in 1910 and since has had a wide engineering experience. For six years he was affiliated with Lupfer & Remick, Buffalo, consulting and contracting engineers, where his work mostly was in connection with the New York state barge canal. He later became connected with the Hunkin-Conkey Construction Co., Cleveland, as manager of its western New York office and his most recent connection was with the Lakewood Engineering Co., Cleveland, as construction sales engineer in Michigan. He is an associate member of the American Society of Civil Engineers and is a member of the Engineers Club of Buffalo.

Financial Outlook Improving

Gain in Federal Reserve System's Ratio Despite Crop Moving Strain Shows Corrective Forces at Work—Easier Money Rates on the Way—Price Declines Are Continuing—Republic Earnings—General Financial News

BY JOHN W. HILL, FINANCIAL EDITOR

IMPROVEMENT in the reserve ratio of the federal reserve system last week and continued recovery of the investment market, at the height of the crop moving credit strain, emphasize the fundamental soundness of the financial situation in this country. These developments were especially significant in view of the uncertainty which appears to be growing in the industrial world. It is well to remember however that the greater part of any unfavorable sentiment has regard for the immediate prospects for prices, profits and business activity. Covering an extended period of months forces are already at work which point to a turn for the better.

Six months ago when the era of deflation appeared, the country was in a shape financially which compared with the conditions existing in 1907. But due to the precautionary measures of the federal reserve board and the fact that there is not believed to be a general actual overproduction of goods based on normal needs, underlying corrective forces are making headway.

The fact that the reserve ratio of the federal reserve system has not been pulled down to the low level of the year, in spite of the tremendous burden entailed by the crops, shows that an easier money market is near. Just as soaring prices, rampant speculation and feverish industrial activity swallowed up available credit resources, so the change in the tide will give relief in this quarter. Lower prices and lower payrolls will lessen the need for an inflated circulating medium.

Once the peak pressure of crop financing is relieved and improvement in the financial situation begins to be expressed in practical terms of freer loans and declining interest rates, the solid groundwork for quickened industrial activity will have been laid. In the meantime, nothing will help bring about the revival more certainly than the continued fall of prices, declining wages and increased labor efficiency. With commodity and labor costs on a level inspiring the confidence of buyers, added to the stimulation of easier money conditions, business should get a fresh start. The greatest problem now is the adjustment of commodity prices. If they could be gotten down to rock bottom at one stroke without disaster the present difficulties would be solved. But danger lies in too drastic deflation. Already the general average of wholesale commodity quotations are down over 20 per cent from the peak of the year, while many prices have fallen from 30 to 75 per cent. Greatest declines have taken place in cases where as Judge E. H. Gary says prices were "outrageously high."

Enormous inflation, government taxes which will amount to $4,000,000,000 annually, higher freight rates, and the lagging wage declines, are looked upon by many as factors which will prevent prices from getting to a prewar basis for a long time. Yet some commodities are at or near the 1913 levels. Raw rubber is under the 1913 price, hides are back to the prewar price, cotton and copper are near their old quotations.

Deflation continues to spread throughout many lines of industry. Plants are closing down and unemployment is growing even in the iron and steel industry. In the textile trades employes are offering to accept wage reductions. Some employers in the iron and steel and allied industries report that wage costs have been cut from 15 to 30 per cent by increased efficiency of men. As unemployment grows, prices of farm products and other commodities fall, and business profits diminish, it is inevitable that the public's purchasing power should decline. But with the increasing value of the dollar the purchasing power of wages, salaries and fixed incomes will have a compensating growth.

Bankers meeting in Washington last week expressed faith in the future. One important move was taken in the approval of plans for a $100,000,000 export financing organization. With the demoralization of foreign exchanges and the lack of credit facilities, sales abroad have been declining. This is a serious development in view of the need for maintaining a foreign market for surplus manufactured goods. At the present moment the conditions in Europe and South America are favorable but with a large finance corporation in existence needed stimulus should be given the country's foreign trade.

Charcoal Iron Earnings Gain Sharply

Earnings of the Charcoal Iron Co. of America, Detroit, gained sharply in the third quarter according to a statement covering that period issued by President Frank W. Blair. Net profits of $626,723 are reported as against $350,197 in the preceding quarter. For the nine months of the year the company earned $1,202,828 as compared with only $306,427 in the corresponding period one year ago.

All plants of the company except the one at Boyne, Mich., now are in full operation and during the third quarter produced 28,113 tons of charcoal pig iron; 337,868 gallons of wood alcohol; 5,528,777 pounds of acetate of lime; 3,007,696 feet of lumber, and 80,784 tons of ore.

The surplus of $1,406,611 as of Dec. 31 has been increased to $2,608,440. Capital stock of $8,056,600 now is outstanding, of which $5,217,250 is 6 per cent cumulative preferred stock. Total assets are listed at $14,589,020.77, of which $10,672,384.52 is in property account and $3,781,073.24 in current assets inclusive of $2,519,957.31 of inventories. Liabilities include besides outstanding capital stock, $1,063,830.90 of deferred and $1,407,138.37 of current liabilities, reserves and provisions total $1,452,010.99. President Blair reports that net quick assets increased $403,012.53 during the third quarter and $909,782.65 during the full nine months period.

Republic Steel Bookings Fall, Earnings Up

Fresh evidence of the rise in steel company earnings by a decline in unfilled orders is found in the report of the Republic Iron & Steel Co. for the quarter ended Sept. 30. Although the company's net earnings increased 71 per cent over those for the three months previously bookings are shown to have fallen 11 per cent.

The surplus for the quarter after charges and dividends were $2,419,373 against $1,418,000 the preceding quar-

ter and $425,782 in the corresponding quarter of one year ago. For the first nine months of the year the company's net earnings available for dividends were $7,389,689 against $2,836,020 in the same period of 1919. In the third quarter of the current year the company charged off $548,875 for depreciation against $422,475 one year ago. After all dividends and charges the surplus for the nine months is $4,727,190 against $299,924 in 1919.

Unfilled orders as of Sept. 30 were 333,889 tons against 491,585 three months before and 433,495 one year ago. The comparative income account of the company for the third quarter and the nine months follow:

THIRD QUARTER

	1920	1919
*Net earnings	$3,960,902	$1,740,407
Other income	77,791	135,478
Total	$4,038,693	$1,740,407
Dep. and renew.	394,488	337,747
Exh. of min.	154,387	84,728
Bond interest	182 945	182,263
Balance	$3,306,873	$1,127,147
Pfd. dividends	437,500	437,500
Com. dividends	450,000	407,865
Surplus	$2,419,373	$425,782

*Net earnings after deducting charges for repairs and maintenance of plants amounting to $1,627,147 and provision for federal and excess profits taxes.

NINE MONTHS

	1920	1919
*Net earnings	$9,107,699	$4,265,712
Other income	358,204	506,265
Total income	$9,465,813	$4,771,917
Dep. and renew.	1,157,609	1,136,095
Exh. of min.	366,407	260,690
Bond interest	552,107	539,113
Balance	$7,389,690	$2,836,019
Pfd. dividends	1,812,500	1,812,500
Com. dividends	1,350,000	1,223,595
Surplus	$4,727,190	$299,924

*Net earnings after deducting charges for maintenance and repair of plants and provision for federal and excess profits taxes.

Pittsburgh Steel Annual Earnings Lower

The report of the Pittsburgh Steel Co. for the year ended June 30 shows net profits after charges and federal taxes of $1,961,459 as compared with $2,771,546 for the preceding year. The earnings last year were equivalent to $17.52 a share earned on its outstanding common stock against $29.09 one year before. The company's sales totaled $27,483,106. In 1919 they were $31,265,012. In 1918 sales aggregated $37,930,842. The comparative consolidated profit and loss account of the company and its subsidiaries follows:

	1920	1919
Sales	$27,483,106	$31,265,012
Exp. dep., etc.	23,906,768	27,240,756
Selling expense	771,999	1,069,483
Balance	$2,804,339	$2,954,773
Federal tax, etc.	1,078,432	244,051
Balance	$1,725,907	$2,710,722
Other income	235,551	60,824
Net profit	$1,961,459	$2,771,546
Preferred dividend	735,000	735,000
Common dividend	560,000	910,000
Surplus	$666,159	$1,126,546

Steel & Tube Sales Up

Total sales of the Steel & Tube Co. of America for the nine months ended Sept. 30 were $64,193,149. For the month of September sales were $7,887,506, while was above the monthly average. The company's balance as of Sept. 30 was $7,422,191. The consolidated statement of earnings follows:

	Month of September	Nine months ending Sept. 30
Sales	$7,887,508	$64,193,149
Gross operating profit	1,546,753	11,099,832
Total income	1,598,613	11,467,742
Net earnings	1,219,070	9,611,362
Interest	145,053	1,270,421
Bal. for pfd. stock	1,074,020	8,340,941
Month's proportion of pfd. dividend	102,083	918,750
Balance	971,943	7,422,191

Receiver Is Discharged

Judge A. B. Anderson, in the Indianapolis federal court on Oct. 7, dismissed the bankruptcy proceedings brought against the William Small Co. last August by the Warner Malleable Co. and Hoess Bros., Hammond, Ind., and the Columbus Bolt Co., of Columbus, O. The receiver was discharged. The court adjudged the company to be solvent, at a hearing on the petition of the Vonnegut Machinery Co. under written conditional sale contracts.

Harry C. Sheridan, referee in bankruptcy, appointed the Union Trust Co. as receiver for the Small company in August. The petitioning creditors at that time alleged that the company owed them a total of $7,869.03.

Dividend Is Deferred

The Lincoln Motor, of Detroit, has deferred payment of the quarterly dividend on its class A stock due this month, owing to the stringency in the money market, according to President Henry M. Leland. It is announced that payments, which are cumulative, will be resumed as soon as industrial conditions return to normal. Mr. Leland states that no cancellations have been received by the company and that cars are being produced in quantity.

Financial Crop Ends

THIRD quarter earnings of the Virginia Iron, Coal & Coke Co., of $1,073,701 show a gain over the $790,253 in the preceding quarter. For the first nine months the company earned a total of $2,428,918.

* * *

Ford Motor Co. of Canada, Ltd., with plant at Ford City, Ont., annual report for the fiscal year ending July 31, last, shows net profits for the 12 months of $5,664,834.75 on the $7,000,000 of capital stock issued. From this the company reserved $968,590.76 for the Canadian business profits tax and paid dividends of $1,750,000.

* * *

Application has been made for an appointment of receivers for the Tindel Morris Co., Eddystone, Pa.

* * *

Kalamazoo Spike & Nipple Co., Kalamazoo, Mich., has increased its capital stock from $50,000 to $250,000 and plans a factory.

* * *

The Pullman Co. has declared the usual quarterly dividend of $2 a share, payable Nov. 15 to stockholders of record Oct. 30.

* * *

Directors of the Avery Co., Peoria, Ill., have voted a 100 per cent dividend, payable Nov. 1 to stock of record Oct. 11. This action increases the common stock of the company from $2,500,000 to $5,000,000.

* * *

A petition has been filed for the dissolution of the King Motor Co., Detroit, and the appointment of a receiver for it due to the lack of working capital and inability of directors to give their attention to the affairs of the concern.

* * *

The Motor Wheel Corp., Detroit, recently organized with authorized capital stock of $11,000,000 to manufacture automotive wheels and pressed metal motor car parts, reports net earnings of $451,791 for the six months ending Aug. 31 last.

* * *

Announcement was made recently that William Esterley had been appointed receiver for the Indianapolis Corrugating Co. on a petition filed in Superior court, room 3, by Gideon Blain. Mr. Esterley gave bond in the sum of $10,000.

* * *

Appointment of a receiver and dissolution of the corporation has been decided upon by stockholders and creditors of the Holland Engine Co., Holland, Mich. The company will be reorganized and officials say that assets are sufficient to meet all claims in full.

Refractories Card

Of Price Extras Adopted—Method of Application Explained

Pittsburgh, Oct. 26.—Complete details on the new card of price extras on refractories has been worked out, and it has been adopted and put into effect by a number of prominent producers of fire clay and silica brick. As stated previously, the plan follows closely the percentage method used by manufacturers of steel plates. The new card has been worked out and made public by the classification committee of the Refractories Manufacturers' association, J. M. McKinley, vice president and general manager of the Crescent Refractories Co., Curwensville, Pa., is chairman of the committee.

It is thought that practically all makers of refractories will adopt the card, but it is stated authoritatively it will not be adopted by the Refractories Manufacturers' association as a body. It is announced that the classification committee merely has reported its findings as a matter of engineering work and that it will be left to the individual operators as to whether or not they will adopt the new plan of basing their prices for brick.

The card classifies prices of the various shapes according to the cost of manufacture and each class takes a percentage extra over the base. Thus the extra or up charge on any class of shapes automatically changes with any change in the base price. In the new card there are 13 classes, A to N, the letter I not being included, with base prices on 9-inch brick ranging from a minimum of $20 to $65 per 1000. The percentage differentials are provided for in the various classes, ranging upward according to the cost of making the different shapes, but with a minimum of $3 under class A up to where the base reaches $35, when the established percentage differential of 8 per cent, class A, becomes uniformly applicable, provided the correct quantity differential pertains.

Under the first rule all specifications for one specific shape amounting to 2500, 9-inch equivalent and over, the classification is applied, while under the second rule all specifications for one specific shape amounting to 2499 to 500 brick, 9-inch equivalent, the next higher class is applied. Under the third rule, on all specifications for one specific shape amounting to less than 500 brick, 9-inch equivalent, the second higher class is applied. The percentage differentials range from 8 per cent under class A up to 500 per cent under class N over the bases. Card and rules as prepared by the committee are presented in the accompanying table.

Classification of a large number of the shapes in common use has been made according to the costs of production and it is expected that as further cost figures are obtained a complete list of all shapes in general use can be prepared. It is announced that this is the first general change in fire brick extras since brick was selling for $18 to $20 in 1912 and 1913. The classification, while based on recent cost figures, is similar to the same percentage of the 9-inch base price as the extras used when brick sold at $20.

Refractories

FIRE CLAY BRICK
(Per 1000 f.o.b. works)

Pennsylvania, No. 1	$50.00 to 60.00
Pennsylvania, No. 2	40.00 to 50.00
Ohio, No. 1	45.00 to 50.00
Ohio, No. 2	30.00 to 35.00
Illinois, No. 1	45.00 to 50.00
Illinois, No. 2	35.00 to 40.00
Kentucky, No. 1	45.00 to 50.00
Missouri, No. 1	50.00 to 55.00
Missouri, high grade	60.00 to 65.00
Maryland No. 1	50.00 to 60.00
Maryland No. 2	45.00 to 50.00

SILICA BRICK

Pennsylvania	55.00 to 60.00
Chicago	60.00 to 65.00
Birmingham	56.00 to 61.00

MAGNESITE BRICK
(Per Net Ton)

9 x 4½ x 2½	$110.00

CHROME BRICK
(Per Net Ton)

9 x 4½ x 2½	$100.00

BAUXITE BRICK
(Per Net Ton)

55 per cent	$40.00 to 45.00
76 per cent	90.00 base

Establishes British Branch

Simonds Mfg. Co., Fitchburg, Mass., maker of saws, has recently secured a charter and established a new company in Great Britain, to be known as Simonds Saws, Ltd. An office and shop has been opened at 53 Bayham, Camdentown, London N. W., where a full line of saw steel products as is demanded in Great Britain will be carried. The shop will provide for maintenance and repairs of saws, machine knives, and other edge tools produced by the Simonds company.

Guy A. Eaves, formerly connected with the Fitchburg plant of the company, has assumed the duties as office manager, and Leon E. Wilbur, who has covered the Great Britain territory for the company since his discharge from the army in France, will be associated with him.

The Simonds company now maintains plants in Fitchburg, Chicago, and Montreal, Canada, and operates a steel mill at Lockport, N. Y., where the steel used in the manufacture of its products is made. In addition to the new British branch the company maintains 12 branch houses, located in the United States and Canada.

Classes and Percentage Extras for Refractories

EXTRAS TO BE ADDED

When 9-inch base is	A	B	C	D	E	F	G	H	J	K	L	M	N
	8%	15%	30%	45%	60%	75%	100%	135%	175%	225%	300%	400%	500%
$20.00	$3.00	3.00	6.00	9.00	12.00	15.00	20.00	27.00	35.00	45.00	60.00	80.00	100.00
25.00	3.00	3.75	7.50	11.25	15.00	18.75	25.00	33.75	43.75	56.25	75.00	100.00	125.00
30.00	3.00	4.50	9.00	13.50	18.00	22.50	30.00	40.50	52.50	67.50	90.00	120.00	150.00
35.00	3.00	5.25	10.50	15.75	21.00	26.25	35.00	47.25	61.25	78.75	105.00	140.00	175.00
40.00	3.20	6.00	12.00	18.00	24.00	30.00	40.00	54.00	70.00	90.00	120.00	160.00	200.00
45.00	3.60	6.75	13.50	20.25	27.00	33.75	45.00	60.75	78.75	101.25	135.00	180.00	225.00
50.00	4.00	7.50	15.00	22.50	30.00	37.50	50.00	67.50	87.50	112.50	150.00	200.00	250.00
55.00	4.40	8.25	16.50	24.75	33.00	41.25	55.00	74.25	96.25	123.75	165.00	220.00	275.00
60.00	4.80	9.00	18.00	27.00	36.00	45.00	60.00	81.00	105.00	135.00	180.00	240.00	300.00
65.00	5.20	9.75	19.50	29.25	39.00	48.75	65.00	87.75	113.75	146.25	195.00	260.00	325.00

Minimum $3.00 up.

In connection with this plan, the following rules on quantity differentials have been established:

Rule 1—All specifications for one specific shape amounting to 2500, 9-inch equivalent and over apply classification.

Rule 2—All specifications for one specific shape amounting to 2499 to 500, 9-inch equivalent apply next higher class.

Rule 3—All specifications for one specific shape amounting to less than 500, 9-inch equivalent apply second higher class.

For the convenience of customers, shapes will continue to be sold at piece prices. Should this plan be generally adopted by the refractory industry, it is believed it will be very favorably received by the users of brick, as it does away with the almost endless confusion and irregularity that formerly resulted from the use of various plans of figuring piece extras.

Obituaries

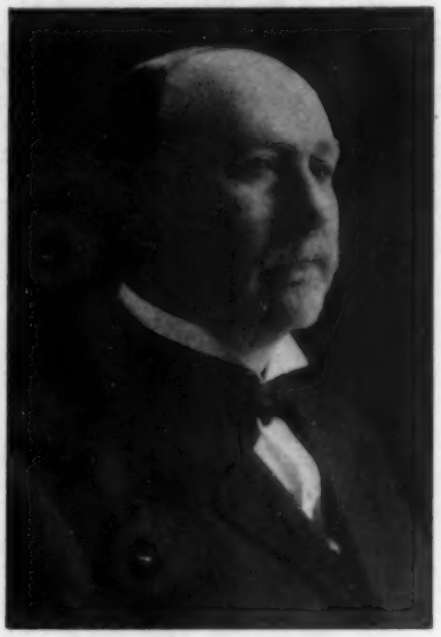
PATRICK NOBLE, president of the Pacific Rolling Mill Co., San Francisco, who died in Stanford hospital that city Oct. 2, after a brief illness was well known throughout iron and steel industry of the Pacific coast. He was prominently identified with the early development of the industry in that territory. Born in 1849 at Abbeville, S. C., he attended Charleston college with the class of 1868 after having fought with the Confederate army during the first seven months of 1865. In 1868 as a 19-year old youth, he traveled to San Francisco via Cape Horn and presented a letter of commendation from a business man in New York to W. C. Ralston, who with D. O. Mills, William Alvord, Gov. Leland Stanford, James Flood and Senator Fair and others made up the list of stockholders of the Pacific Rolling Mill Co., then in process of formation and Mr. Noble started as a clerk in the business and was promoted to the general managership. At that time he became a close friend of the late Andrew Carnegie and consulted with him many times in reference to proposed extensions or betterments of the Pacific Rolling Mill Co., which then had as large equipment as any plant of the Carnegie Steel Co., and for many years dominated the steel situation on the Pacific coast. Because of the industrial disturbance of 1893 and due to the inability of the company to secure adequate scrap supplies, it became necessary for the company to reorganize as a structural shop which was accomplished in 1898. At that time, Mr. Noble became president and held that position until his death. His son, Edward B. Noble is vice president of the Pacific Rolling Mill Co., and the business will continue under his direction.

John F. Wolff, formerly president of the L. Wolff Mfg. Co., Chicago, and a son of the late Ludwig Wolff, founder of the company, died Oct. 18, aged 61 years. He was born in Chicago and passed his entire life in that city. He formerly was a member of the board of education and a director of the Chicago Athletic association.

John D. Barrett, for 14 years a director in the Colonial Iron Co., 149 Broadway, New York, with furnace at Riddlesburg, Pa., died at his home in Greenwich, Conn., Oct. 20, after being struck by a passenger train. Mr. Barrett's principal activities were in the banking and insurance fields. He was 68 years old.

J. Walter Norton, mechanical engineer and formerly with the Pressed Steel Car Co., at Pittsburgh, died Oct. 18 at his home in Brooklyn, aged 38. Mr. Norton is a graduate of the Pennsylvania State college.

Richard Lamb, 90 West street, New York, consulting and construction engineer, died Oct. 19 at the Methodist hospital, after a short illness. Mr.



PATRICK NOBLE

Lamb was 61 years of age and was a graduate of Brown university. One of his first important engineering works was the surveying of the Albemarle & Chesapeake canal. He built the largest coal pier and for a time was chief engineer of the Wilmington, Newburn & Norfolk railroad. He also opened up the Virginia Copper Co.'s mine and erected its plant, and designed a plant for extracting copper from ore by electricity instead of the old smelting process. He was a member of the American Society of Civil Engineers, the American Institute of Electrical Engineers and the New York Electrical society.

George Tangye, one of the founders of the great firm of Tangyes, Ltd., Birmingham, England, died Oct. 7, at his home, Heathfield Hall, near Birmingham. That home, as the former residence of James Watt, was a kind of mecca to the world's engineers, and many Americans have visited it at various times. Although of the advanced age of 85, Mr. Tangye's death was somewhat unexpected, his last illness being of short duration. Commencing life on his father's farm in Cornwall, Mr. Tangye subsequently joined his brothers in the small engineering concern in Birmingham, which many years ago attained gigantic dimensions. He was a great social worker, a prominent Quaker, and, for many years up till quite recently, presided over temperance, social and educational meetings for the men held at the works.

Harry Steel, of Sheffield, England, well known head of the United Steel Companies, and one of the most distinguished steelmakers in Great Britain, was found dead in bed Oct. 7, in London, where he had gone on business the evening before. Prior to his death he was in apparent good health.

Mr. Steel, who was 58 years old, initiated a series of schemes which made his syndicate one of the greatest combines of Great Britain, with a capital of over £9,000,000. Practically all his life was spent in the steel trade. His father founded the well-known firm of Steel, Peech & Tozer, and after a university education, the younger Steel entered the Ickles works of the firm, gradually acquiring a great deal of practical knowledge. Subsequently, he became a director on the board of which his father was chairman. He succeeded his father as chairman of the board in 1915, and in November, the following year, began a series of amalgamations, having for their object complete control of all the essentials of production. The combine at first brought in, under the name of the United Steel Companies, the Frodingham Iron & Steel Co., the Workington Iron & Steel Co., the Rothervale Collieries, Ltd., the Appleby Iron Co., the Scunthorpe Iron Co. and Dinningham Iron & Coal Co. A few months ago Daniel Doncaster & Sons, Ltd., the Martino Steel & Metal Co., of Birmingham, and Thomas Smith & Co., one of the largest of British stamping concerns, were brought in. The combine had, by this time, become one of the largest in the steel industry, but at the time of his death, Mr. Steel had visions of still larger extensions.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

THE largest single contract that has ever been taken by the Waukesha, Wis., exclusive manufacturer of motor truck and tractor engines, has been closed by Harry L. Horning, vice president and general manager. It amounts to in excess of $5,000,000, with contingent contracts making the aggregate value of the order at least $15,000,000 at its termination. While the name of the buyer is not given out, it is said to be the International Harvester Co.

With this and other contracts recently booked, the Waukesha Motor Co. expects to do a business of more than $10,000,000 for the year 1921. The plant was established in 1910 and in its first year did a business of $20,000. The volume for the past year is in excess of $5,000,000. Its payroll has grown to $100,000 a month. The present area of the plant is 300,000 square feet.

S. A. Perkins, president of the company, said: "In order to carry out this contract, new equipment and larger inventories of material will have to be effected. It will also require larger capacity from the local industries from which we buy considerable material. These include the Spring City and Blair Foundry companies, gray iron; Werra Aluminum Co.; Waukesha Brass Co.; Waukesha Malleable Iron Co., and Spring City Pattern Works."

In order to finance the execution of the large order and meet other capital requirements, the Waukesha company will make a new issue of 8 per cent preferred stock, which it intends to market locally. The company is owned and controlled exclusively by Waukesha capital and virtually every director and executive is a native of that city or county.

* * *

PAPERS of incorporation have been filed here by the Indianapolis Iron & Metal Co., Indianapolis, newly organized to deal in scrap iron. The company is capitalized at $10,000 and has as directors Louis Sandow, Harry Goodmay and Mayer Brainin.

* * *

SEVERAL new large presses of the heavy type are being installed by the Crosby Co., Buffalo, sheet metal stamping. The company has just completed a new addition. William H. Crosby is president and L. R. Cooper is secretary.

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THE Walker Axle Co., 72 West Adams street, Chicago, has applied for a local charter to do business in Wisconsin. The capital invested in this state is given as $25,000, but the application does not give the name of the Wisconsin agent.

* * *

WITHOUT contemplating additional tools, shop machinery or buildings, the Metal Office Furniture Co., Grand Rapids, Mich., has doubled its authorized capitalization to $200,000. This move was taken to provide for its increasing volume of business. W. D. Idema is vice president.

* * *

PRESIDENT W. C. BOREN, of the Carolina Steel & Iron Co., Greensboro, N. C., announces the purchase of a large site near the company's present plant, for the purpose of expanding the business. About $50,000 is to be expended on plant enlargement.

* * *

THE Rutenberg Motor Co., which sometime ago sold its plant in Marion, Ind., to the Velie Motor Co., Moline, Ill., announced recently that it had bought the plant of the American Chain Co., in West Marion and expected to begin operations soon. The company will manufacture automobile parts and motors.

* * *

O. S. BICKFORD, founder of the Bickford Machine Co., Brattleboro, Vt., has started a new business under the name of the Bickford-Switzer Co. in Greenfield, Mass. It will make small tools and special machinery, having secured a factory on Norwood street, formerly occupied by the Arrow Mop Co.

* * *

MAX KESSELMAN, of the Marion Iron & Metal Co., Marion, O., has purchased property from the Houghton Mfg. Co., located on the site of the old Leader Mfg. Co.'s plant on the West Side, with trackage on the Big Four railroad. He will conduct a wholesale and retail business of buying iron, steel, metals and hides. He also will sell coal. The business is to be conducted under the name of Kesselman Iron & Coal Co.

* * *

FREYN, BRASSERT & CO., Chicago, engineers, have been awarded the contract for furnishing a complete thickener installation at the Leetonia, O., plant of the M. A. Hanna Co., Cleveland. These engineers also have been retained by the Jackson Iron & Steel Co., Jackson, O., to make repairs to its blast furnace.

* * *

PLANS are being made for the construction of the first unit at Miley avenue and West Michigan street, Indianapolis, of a large foundry by the Lavelle Foundry Co., which now operates a plant at Anderson, Ind. The plant will cost approximately $200,000. The company plans eventually the construction of two more units of equal size.

* * *

FULLY equipped for the manufacture of tire molds and cores for rubber and automobile manufacturers as well as to do general machine work, the Plummer Machine Co., Ltd., 80-82 Chestnut street, Toronto, Ont., is capitalized at $100,000. The company which recently was formed also produces aluminum castings. A. Plummer is president.

* * *

THE Detroit Edison Co., Detroit, is completing the foundation work on a $1,000,000 power plant at Marysville, Mich., which will serve the industries of Port Huron, Marysville and surrounding manufacturing centers. Approximately 3000 tons of structural steel are being used in construction of a boiler room, 135 x 150 feet.

* * *

TOOLS and machinery are being installed in the new Battle Creek, Mich., plant of the Clark Equipment Co., Buchanan, Mich., now nearing completion and in which will be manufactured motor car axles. On a site of 23 acres, the company has erected a manufacturing building, 99 x 440 feet, a warehouse 50 x 144 feet and a power house.

Here and There in Industry

Live Information Which Records the Expansion of Various Lines of Productive Enterprise

OF STEEL and brick construction with steel made sash and concrete floor, the extention to the machine shop of the Excelsior Tool & Machine Co., East St. Louis, Ill., measures 70 x 110 feet, making the total length of the machine shop 320 feet. The extension will be utilized for assembling and crating the machines manufactured by the company, comprising power shears, arch presses, punch presses, polishing lathes, automatic polishing machines, brakes, hydraulic tire presses and other small machines for the sheet iron and steel working trade. Overhead units will heat the machine shop extension, circulation being forced by motor driven fans. This company recently has changed its entire plant from steam to motor power.

This company's new foundry extension is 80 x 118 feet and is of steel and concrete construction, making possible a 100 per cent increase in tonnage. Two cupolas have been installed with a melting capacity of 10 to 15 tons per hour. Two core ovens are located near the center of the foundry and the core storage racks are conveniently located near the molding floor. Two 5-ton cranes with 40-foot 8-inch spans, which travel the entire length of the foundry or 330 feet enable the company to handle castings weighing up to 10 tons each. The plant is located on an electric service line and a belt line, both of which have direct connections with approximately 24 trunk lines.

* * *

OFFICIALS of the Pioneer Brass Co., Indianapolis, announce that the company will build three additional buildings to its new plant which now is under construction. The cost will be about $175,000. In addition to the plant as originally designed and now being built, another foundry building, 150 x 200 feet, a machine shop, 75 x 200 feet and a pattern building, 50 x 50 feet will be constructed.

* * *

NOW under construction, the new machine shop of the Lynch Glass Machinery Co., Inc., Anderson, Ind., is approximately 100 x 125 feet and is 1-story high. The H. K. Ferguson Co., Cleveland, is the contractor and according to T. C. Werbe, secretary-treasurer of the Lynch company, the only equipment which will be purchased at present is a 42-inch radial drill and a 42-inch vertical boring mill.

* * *

MACHINERY, involving the expenditure of approximately $4000 or $5000, has been purchased recently by the Metal Arts Co., Inc., Rochester, N. Y., according to a statement by President John Jack. The company recently increased its capital stock to take care of the normal increase in its business, which has grown rapidly since it was formed seven years ago.

* * *

THE Austin Co., Chicago, has taken the contract to erect a brick and steel building, 150 x 200 feet, at Oconto, Wis., for the Montana Tractor Co., of Tinley Park, Ill. It will be equipped as a machine shop and assembling floor and the total cost is expected to be in the neighborhood of $150,000. C. M. Haight, vice president of the Montana company, is manager of the new Oconto plant.

* * *

WORK started Sept. 30 on a new $500,000 plant for the Steel Fabricating Corp., Michigan City, Ind., and the building is expected to be completed before Jan. 1. The W. H. Johnson Sons Co., Indianapolis, has the heating plant contract. The fabricating corporation has plants at Harvey and Chicago Heights, Ill., but expects to make the new plant its principal one. It will fabricate structural steel for building purposes.

* * *

OF AN authorized capital of $50,000, $12,200 has been paid in by those interested in the American Knife Co., 25 Boyd street, Winsted, Conn. This company was incorporated when one of the former partners sold his interest. The following now are the officers: President, I. E. Manchester; vice president, Domenico Russo; secretary and assistant treasurer, Domenico Alberti; and treasurer, I. E. Manchester.

* * *

THE American Steel Products Co., Johnstown, Pa., recently organized with a capital stock of $300,000, has purchased the foundry of J. V. Hughes & Co. at New Florence, Pa., and has started operations in its new plant. A 2-story structure adjoining the foundry also has been taken over by the Johnstown concern and will be remodeled and equipped for the manufacture of automobile accessories and other steel and aluminum articles.

* * *

THE Liberty Mfg. Co., Bridgeport, Conn., which recently increased its capitalization from $250,000 to $3,000,000, is completing the first unit of a plant where it plans to develop the manufacture of air-cooled motors of 4 to 12 cylinders. For motors of the 6-cylinder type, the company reports it has orders from a foreign buyer which will take the entire production for many months to come. Joseph S. Lach, of Milford, Conn., is president of the company.

* * *

ADVICE comes from the Kelly Spring Co., 1010 Gilbert avenue, Cincinnati, to the effect it has been incorporated with a capital stock of $100,000 preferred and $100,000 common, to handle the replacement output of one of the largest spring plants in the country, marketing throughout the world. The company plans to build a small plant at Cincinnati, to take care of small runs. Officers are: President, B. R. Winbam; treasurer, Harry P. Kelly, and secretary, J. B. O'Donnell.

* * *

THE third annual sales conference of the J. F. Byers Machine Co., Ravenna, O., was held at Glen Crest hotel, Lake Stafford, recently, 35 representatives being present from all of the principal cities in the United States excepting those of the Pacific coast. The conference closed with a banquet. Plans were laid for the business of the coming year and reports of sales during the past year were satisfactory. The company is getting ready for anticipated expansion by the building of a new erecting department adjacent to the present one. The new building will be of steel and concrete and will be 60 x 120 feet, with a height of 40 feet. Ground is now being broken for the new structure which will be rushed to completion as rapidly as men and materials are available.

Tool Trading Less Encouraging

Buyers Issue Inquiries but State They Will Not Close Until Prices Come Down—Inquiries Fairly Frequent but Orders Are Few—Many Dock Cranes Are Up in New York

MARKED by less encouraging signs than for a few weeks back, machine tool trading is at a low ebb, with users generally looking for lower prices and holding up their orders on that account. At the same time, statements are more frequent from the manufacturers to the effect that they cannot reduce prices on the basis of present costs despite guarantees against declines. Small sized inquiries as well as lists of greater extent are dormant. Substantial buying is not expected before spring, although some sellers expect a quickened market earlier in the year. Fewer inquiries are reported from the different districts than in several weeks. Some prices are asked for estimating and inventory purposes but these relatively are unimportant. Expected railroad business is not materializing. Deliveries are not improving in the degree anticipated, and several sellers believe that on that account prices will remain at present level.

Announcement is made that the General Electric Co., which has issued some large inquiries in the East, will not close until after Jan. 1. Numerous orders originating in the automotive industry are said to be held up until that time and suspensions are being asked on others already placed. Cancellations seem to have reached the low point. The largest order reported in the East was placed by the Westinghouse Lamp Works, Bloomfield, N. J., for a $40,000 assortment. A similar amount was placed for export to Australia and Perin & Marshall, New York, are asking for foundry and machine shop equipment for shipment to China. The General Electric Co. closed a $7000 purchase of machinery for Lynn, Mass., and the Boston Oldsmobile Co., Boston, bought lathes, grinders, drill presses, shapers, etc., in changing its equipment to motor drive. Duncan MacDonald, Garfield, O., made the largest purchase reported in Cleveland, consisting of lathes and some other machines. He left an inquiry for a few other machines. Dealers still await action by the National Lamp Works.

In the crane fraternity, several dock projects in New York are receiving the major attention. Fourteen 2-deck piers are to replace 32 piers between Vesey and Perry streets, Manhattan, and each will require eight cranes. A similar number will be required for three piers at Stapleton, Staten Island. About 32 cranes will be required for another New York harbor project by the Panamerican Terminal & Dock Corp. The Bethlehem Steel Co. wants soaking pit cranes while the Concrete Steel Co. is inquiring for electrics. Perin & Marshall want two 10-ton cranes for China.

Production Equipment Demand Is Light in East

NEW YORK, Oct. 25.—Buying of tool shop equipment comprises the bulk of activity in the eastern machine tool market, there being very little purchased for production work. While the case is quite exceptional, it is interesting to note that the business of one seller of lathes during the first three weeks of this month has exceeded the volume in any corresponding period this year due to buying of this former character.

The domestic market, as a whole, however, is still dull. There appears to be a larger number of inquiries than of late, but they largely are for the purpose of testing prices, it is believed, and represent little actual business, at least at this time. The General Electric Co., Schenectady, N. Y., which for some time past has been issuing inquiries, aggregating a considerable number of machines, has advised tool salesmen that no general action will now be taken until after the first of the year. While not placed during the past week, a relatively recent order for about $40,000 worth of miscellaneous equipment was awarded by the Westinghouse Lamp Works, Bloomfield, N. J. An order recently was placed for a similar amount of machinery for shipment to Australia. Perin & Marshall, 2 Rector street, New York, are inquiring for some foundry and machine shop equipment for export to China.

Outstanding among crane orders during the past week is one involving a 50-ton overhead crane, with 44-foot span, for the Baldwin Locomotive Works, Philadelphia. The business was placed with the Morgan Engineering Co., Alliance, O. Another fair sized contract was placed with the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., and calls for a 5-motor grab bucket crane of 2½ cubic yards capacity, with 80-foot span, for installation in the plant of the Raleigh Phosphate & Fertilize. Co., Raleigh, N. C.

David H. Smith & Sons, Fifty-first street, Brooklyn, placed a contract for a 1-motor transfer crane of 7½ tons capacity, with 63-foot span, with the Shepard company. The Columbiana Boiler Works, Columbiana, O., placed a 15-ton crane, with 45-foot span, with the Champion Engineering Co., Kenton, O. Philip Valk, 305 Broadway, New York, recently in the market for a 10-ton electric crane, with 49-foot span, for South America, has withdrawn his inquiry, the business having just recently been placed with a German builder.

The Bethlehem Steel Co., Bethlehem, Pa., is in the market for soaking pit cranes. Perin & Marshall, 2 Rector street, New York, are expected to close shortly on two 10-ton cranes, with spans 45 and 60 feet respectively, for shipment to China. Dowler, Forbes & Co., New York, are inquiring for a 35-ton steam breakdown crane for export.

Specifications are being prepared for mechanical freight

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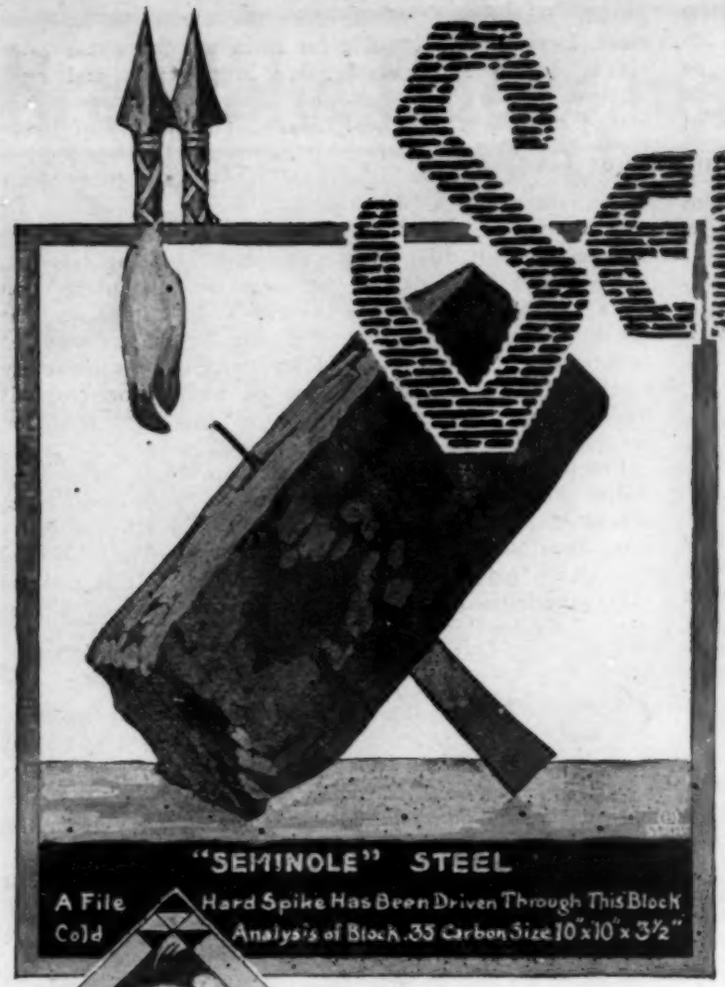

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EST. LUDLUM 1854

handling equipment for new piers to be erected by New York City along the North river. Thirty-two piers between Vesey and Perry streets, Manhattan, are to be torn down and displaced by 14 piers with double-deck sheds. It is believed at this time that eight cranes of 2 tons capacity each, will be required for each pier, four on either side. Work is also going forward on specifications for mechanical equipment for one of three piers to be erected by the city of New York, at Stapleton, Staten island. Eight 2-ton cranes will likely be required for this project. Another waterfront project in New York harbor likely to become active shortly is that of the Panamerican Terminal & Dock Corp., 233 Broadway. Plans have been passed on by the crane builders' committee and the Panamerican company, and are now before the dock commission of the city, which will be in charge of the work. About 32 cranes will be required.

New England Machinery Trade is Confident

BOSTON, Oct. 25.—Underlying the present extreme quietness in the machine tool market a surprising confidence in the future is apparent. While new business throughout New England has dropped to approximately one-third of what it was a month ago machine tool builders almost universally are continuing to operate along normal lines. Several in fact are working full time even though their entire product must be stored. Others have not yet completed their old orders which in some cases will run three or four months into the new year providing no further cancellations are made. Some cancellations of orders have been reported but in most cases even where the user has been forced to close down his plant the existing orders for machine tools are allowed to run. In some cases, in Maine particularly, the closing down of manufacturing plants has been the signal for ordering machine tools in order to overhaul the plant's equipment during the opportunity afforded.

During the past few weeks the General Electric Co. for its Lynn, Mass., plant has been the chief buyer in the Boston market. It still is in the market with an active list of milling machines. Orders for lathes and cold saw cutting off machines, and other equipment placed last week by this user aggregated approximately $7000. The Boston Oldsmobile Co. has been buying equipment in connection with changing its plant from belt drive to individual motor drive and orders for this during the week have included lathes, grinders, drill presses, shapers, etc.

New school construction throughout New England is furnishing an almost continuous demand for woodworking tools and other light shop equipment for students' use. One contractor for a nearly completed school is now in the market for about $6500 worth of lathes, small drill presses, and grinders. Paper mills and paper machinery manufacturers have more business than they are able to take care of and are coming into the market from time to time for individual lathes and other machine shop equipment. Orders from such concerns during the week have included three lathes. The navy department is asking for bids covering a steam locomotive crane for the South Boston drydock. Bids for this close Oct. 27.

Tool Users Remain Purposely Out of Market

PITTSBURGH, Oct. 26.—In keeping with the attitude of buyers generally, users of machine tools apparently are staying out of the market with the one object in mind of forcing down prices. Their position has become more clearly defined in this direction during the past week than heretofore. Makers and sellers who have canvassed the situation over a wide territory report frankly that buyers realize that the period of readjustment, foreseen as inevitable for some months already has set in in no unmistakable way in the iron and steel markets, as in other lines, and further readjustments are looked upon as a matter of course. The address of Judge Gary last Friday before the American Iron and Steel institute has further stimulated confidence that lower prices are about to develop.

It is believed by some machine tool interests that there will be no substantial buying movement until next spring, while others look for such an event to take place soon after the first of the new year. They appreciate that lower prices may develop and can be made, provided iron and steel prices come down to a more satisfactory level, although the maintenance of high labor costs is looked upon as a serious obstacle to any great reduction in prices.

Practically no inquiries for machine tools have been noted the past week and some users, who have asked for estimates, including iron and steel and railroad interests, have withdrawn from the market and others who have taken bids have postponed purchases. It is claimed that cancellations for machine tools are confined almost exclusively to the automobile industry.

Spasmodic Inquiry Interrupts General Dullness

CHICAGO, Oct. 25.—Speaking generally, the machine tool trade is experiencing its dullest period and most dealers find practically no inquiry coming to them. Occasionally exceptions occur and now and then a dealer hazards the opinion that he sees some recovery from the dullness. Usually this is sporadic and does not last. Cancellations, which were a feature a few weeks ago, seem to have exhausted themselves and are not now being asked. In place of cancellations, some suspensions are asked, delaying shipments until after the first of the year, but these are not numerous.

No real downward movement in prices has started in this vicinity, but some machine tool builders offer protection on present prices until Jan. 1, while a few have extended this guarantee to cover the first six months of next year. An isolated advance of 10 per cent on a small special tool is noted. Present business conditions have caused the National Machine Tool Dealers' association to advance the date for its New York meeting from Dec. 2 to Nov.11-12. It will be held at the Hotel Astor, New York.

In spite of large total inquiries from railroads now pending, an expectation for several weeks past that some of this business would be placed, no activity has developed and the inquiries are stlll unfilled. No new business is developing in the railroad line on the part of the roads which have not placed inquiries. Crane business is practically at a standstill, with the exception of an occasional sale of a second hand locomotive crane, and sellers of this equipment find practically nothing in the way of new business.

Single Tool Inquiries Make Good Business in Canada

TORONTO, Ont., Oct. 25.—Steady demand continues for machinery and machine tools in the Canadian market. From a wide range of buyers throughout Canada, dealers are receiving inquiries for equipment and while these call for single machines or small quantities of tools, the aggregate is quite large. No large lists have made their appearance lately.

Various railroads throughout the Dominion are spending money on improvements to their car building and repair plants and these are from time to time entering the market for equipment, but with the exception of the Grand Trunk, which issued a fairly good sized list a few

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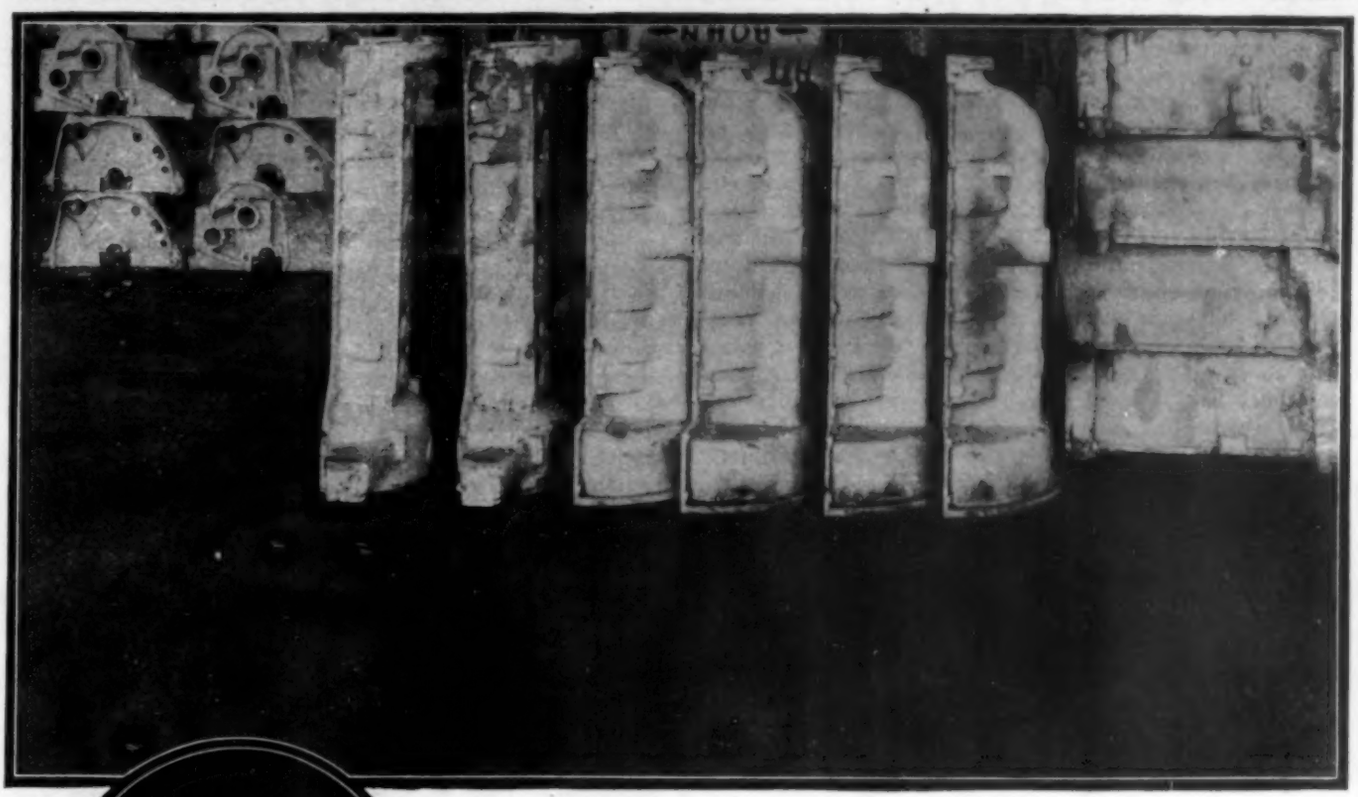

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THE Bohn Foundry of Detroit first proved to its satisfaction the truth of the claim—then ordered a big installation of KREODONE.

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In the face of ample and conclusive evidence, there can be no doubt but that KREODONE improves working and production conditions; does away with common delays and accidents due to poor floors; reduces repairs and maintenance to practically nothing and just about eliminates fire risk.

The ultimate cost of a decay-proof, permanent KREODONE floor is less than that of any other known floor material. Consider carefully the following specific facts before you buy.

Every KREODONE block is of selected, long-leaf yellow pine. Through treatment with PURE creosote oil proofs each block against moisture, acid, grease, machine oils and decay. Does not bleed tar. Warm in winter, cool in summer, level, sanitary, solid, resilient and restful, KREODONE is the better, the ideal plant floor.

'KREODONE, for twenty-three years the one, PURE, creosote oil. Watch that spelling—it means Quality and Service."

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315 Peoples Gas Bldg., Chicago
206 Erie County Bank Bldg., Buffalo
152 Bay Street, Toronto, Canada
638 Old South Bldg., Boston
Berkley Ward, Norfolk
222 Society for Savings Bldg., Cleveland
834 Real Estate Trust Bldg., Philadelphia
828 Plymouth Bldg., Minneapolis
445 Central Bldg., Seattle
Masonic Temple, Mobile
211 Hammond Bldg., Detroit
735 M & M Bank Bldg., Milwaukee

weeks ago, buying by the railroads has been on a rather small scale. Dealers now are looking for improved buying on the part of some of the steel plants and foundries which have been busy throughout the greater part of the summer building additions. Several of these are nearing completion and machinery requirements will be made known at an early date.

Small tools are also moving in good volume. Deliveries of machinery and tools to Canadian dealers are showing a big improvement both from United States and Canadian manufacturers. British producers of machine tools are being hard hit by the coal miners' strike, and shipments of equipment to Canada may be curtailed.

Bids will be received until Nov. 9 by R. C. Desrochers, secretary, department of public works, Ottawa, Ont., for the supply of oil engines and generators to be installed in power house at William Head. The Canadian Ingot Iron Co., Guelph, Ont., has started work on a plant there to cost $16,000. The Russell Shale Brick Co., Russell, Ont., has acquired a building there and will install machinery for the manufacture of brick, etc. The Fulton Motors, Ltd., have taken over the building formerly occupied by the Marathon Rubber Co., St. Catharines, Ont., and will install machinery for the manufacture of motor trucks, parts, etc. The Nipigon Fiber & Paper Co., Port Arthur, Ont., has started work on the erection of a plant at Nipigon, Ont., to cost $500,000. The Provincial Paper Mills, Ltd., 54 University avenue, Toronto, has purchased the plant of the Port Arthur Pulp & Paper Co., Port Arthur, Ont., and will make extensions to plant and install additional equipment next year. The Dominion Envelope & Carton Co. has secured a 7-acre site ond Ashbridges bay, Toronto, and will start work in the spring on the erection of a 1-story plant, 300 x 500 feet.

Machinery Buyers Await Price Reduction

CLEVELAND, Oct. 26.—Opinions are divided among sellers of machine tool equipment in this district as to the possibility of general price reduction. Many believe they cannot come and cite the case of a western manufacturer of milling machines who states that his material costs have increased 157 per cent and his labor costs 145 per cent in the period wherein he has advanced the price of his product but 115 per cent, so that he now is selling at a price below what he would be justified in charging. Several manufacturers in the Cincinnati territory and elsewhere have declared positively they cannot make declines and the coming meetings of the National Supply & Machinery Dealers' association, advanced from Dec. 2 and 3 to Nov. 11 and 12 at the Hotel Astor, New York, are awaited with interest because of what may transpire along these lines. Some sellers believe that it would serve to stabilize the market and inspire much buying if the manufacturers would announce a flat reduction of 25 per cent now, assuming any loss there would be. They believe that that would be much better than to announce a reduction of 5 or 10 per cent now and failing to bring out sizable business, be followed by an additional cut, since that would only serve further to unsettle the market.

In the meantime, while numerous inquiries, none of any great size, are current, prospective purchasers maintain their watchful waiting attitude and frankly state they believe prices will come down. Included in this category are several railroads. One of the larger inquiries which continues to lie dormant is that of the National Lamp Works, Cleveland, for shipment to Buffalo. At one end of the line, the word is given out that the award shortly will be made, while at the other, it is stated that final action is indefinitely postponed. This inquiry calls for lathes, milling machines, automatics, etc., and from one manufacturer, the National company is understood to have a positive guarantee against a price decline in nine months. One reason advanced by at least two important dealers as to why they believe prices cannot come down is the fact that deliveries do not improve. Niagara and Toledo punch presses cannot be had inside of five to seven months and on many other lines of machine tools such as lathes and milling machines, no better deliveries than 10 to 12 weeks are quoted.

Many inquiries are current where the inquirer only wants prices for inventories or for estimating purposes, and these mean nothing as a market gage. Orders consequently are few and far between, but it is understood that the Hydraulic Steelcraft Co., Cleveland, has purchased some small Bliss presses and the International Harvester Co., Chicago, has bought some Chambersburg hammers. The Willys-Overland Co., Toledo, O., is believed to be preparing to enter the market for hammers. H. L. Webb, 415 East South street, Warren, O., is in the market for one or more lathes, while the Mosler Safe Co., Hamilton, O., wants a Foster screw machine. The Van Dorn & Dutton Co., Cleveland, still wants some grinding equipment. An interesting inquiry comes from the Lynch Glass Machinery Co., Anderson, Ind., for one each 42-inch radial drill and 42-inch vertical boring mill. The Crosby Co., Buffalo, is installing several large presses for metal stamping in its new addition recently erected. The Wickman Screw Works, 420 Neptune street, West End, Pittsburgh, recently incorporated at $50,000, needs several turret lathes.

Transient purchasers were more active last week than in several weeks preceding. They, however, consumed considerable time in shopping around, going from one dealer's wareroom to another, searching out the lowest prices. One interesting sale of this nature was made to Duncan MacDonald, who operated a shop in Pittsburgh, and who has acquired a 53-acre site in Garfield, O., where he intends to build steam trucks. He visited every machinery house in Cleveland and finally purchased a few Monarch lathes together with some miscellaneous machines, for which he paid cash and left an inquiry for a few additional tools.

The crane market is exceedingly quiet. The Concrete Steel Co., Guardian building, Cleveland, is considering proposals on some Shaw electric cranes.

Considerable business in machine tools, however, continues to show signs of making an early appearance. The Peerless Die & Tool Co., Cincinnati, is to equip a 1-story plant, 40 x 70 feet; the Conneaut Shovel Co., Conneaut, O., will build a $35,000 addition; the Atlas Tool Co., Toledo, O., has been incorporated at $325,000; the Cincinnati Time Recorder Co., Cincinnati, has increased its capital from $500,000 to $750,000, while the Myers Spark Plug Co., Toledo, O., has doubled its capital to $200,000; the Stimpson Computing Scale Co., Louisville, Ky., will enlarge its plant; the New River Co., MacDonald, W. Va., will erect and equip a machine shop; the Larkin Automotive Parts Co., Dayton, O., has been organized by D. C. and J. Larkin; the Nokey Lock Co., Ashland, O., has been incorporated at $10,000; the East Ohio Steel Co. and the Sabotta Heating Co., the Steel Office Equipment Co., Cleveland, are new companies each with $10,000 capitalization; the Marsh Auto Accessory Co., Norwalk, O., is erecting a 1-story, 40 x 80-foot building; the National Drawn Steel Co., East Liverpool, O., is erecting a 1-story plant, 100 x 170 feet, to cost $65,000; the Hullhorst-Micro Tool Co., Toledo, O., recently was incorporated; and the Proof Machine & Brass Foundry Co., Cleveland, recently was incorporated at $150,000.

SOME months ago, after investigating the bearing conditions in a big steel plant, we were able to sell PROMET, *The Heat-Treated Bearing Metal,* under a guarantee that it would give twice the service of the metal then used.

This week the Superintendent writes that PROMET has already given three times the service of any metal they have ever used and wants to know why we do not advertise the remarkable results that PROMET is giving in every kind of machinery.

The service given by PROMET has, however, been so uniformly unusual that we hesitate to adopt this gentleman's suggestion lest we appear to overstate our case.

BUT we are always glad to cite specific instances when requested. Simply use the coupon below.

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PROMET GUARANTEE
The order to which this guarantee is attached is subject to the following conditions:
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Please send me without charge, the miniature pig of PROMET, Guarantee coupons and information regarding the use of PROMET in

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The American Crucible Products Company

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I 16

Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Along Middle Atlantic Seaboard

ALBANY, N. Y.—Ray Gaul, 40½ Madison avenue, has had plans prepared for an addition to his machine shop, one story, 75 x 76 feet, to cost $3000.

BROOKLYN, N. Y.—The Colonial Mantle & Refrigerator Co. plans alterations to its plant at an estimated cost of $30,000.

BROOKLYN, N. Y.—The Clymer Metallic Bed Co. has been incorporated with a capital stock of $40,000, by A. Ostroy, H. B. and J. Meiselman, 100 South Eighth street.

BROOKLYN, N. Y.—The Peterson Tool & Die Works recently was incorporated with a capital stock of $15,000, by H. and C. J. Soss and C. Peterson, 428 State street.

BUFFALO.—The Niagara Gas Corp. recently was incorporated with a capital stock of $5000, by C. Baldy, C. P. Franchot and F. Fernow.

BUFFALO.—The Ross Electrical Corp. has been incorporated with a capital stock of $25,000, by H. Altman, M. E. Olson and E. J. Ross.

BUFFALO.—The Gowdy Mfg. Co., printing machines, recently was incorporated with a capital stock $50,000, by A. M. Montgomery, A. A. and E. J. Gowdy.

FREEPORT, L. I., N. Y.—This city plans alterations to its power house.

NEW YORK.—The United Steel Frame Co., 53 Wooster street, plans alterations to its shops, at a cost of $15,000.

NEW YORK.—The Criterion Steamship Supply Co. has been incorporated with a capital stock of $25,000, by I. M. Fadiman, M. Silver and H. J. Sanders, 41 St. Nicholas Terrace.

NEW YORK.—The Automotor Corp has been incorporated with a capital stock of $275,000, by U. Thompson Jr., D. F. Sullivan and H. P. Swanton, 45 East Seventeenth street.

NEW YORK.—The Republican Machinery & Metals Corp. has been incorporated with a capital stock of $10,000, by H. M. and H. J. Linder and G. J. Atwell, 2025 Broadway.

NEW YORK.—The Kloss Machinery Corp. recently was incorporated with a capital stock of $50,000 by A. Bohr, H. J. Yates and H. Kloss, 51 Chambers street.

NEW YORK.—The Netherlands Chemical Co., Ltd., has been incorporated with a capital stock of $25,000, by R. E. K. Stadnitski, C. K. W. Van Steenwyck and G. J. Mullen, 84 Front street.

NEW YORK.—The Elm-Bell Products Corp. has been incorporated to make machinery with a capital stock of $600,000, by E. E. Mahnken, W. D. Webster and G. Keiser, 150 Autumn avenue.

NEW YORK.—The Mutual Art Lighting Fixture Co. recently was incorporated with a capital stock of $25,000, by G. and G. and J. Murad, 45 Grant street.

TONAWANDA, N. Y.—The Stanley Steel Welded Wheel Corp. plans to erect a plant here, 1-story, 100 x 200 feet, to cost about $100,000.

ARDMORE, PA.—The Autocar Co. is having plans prepared for two 3-story buildings, 85 x 325 feet and 60 x 140 feet.

BELLEFONTAINE, PA.—The Nickel Fabricating Co. has been incorporated with a capital stock of $50,000 by Charles T. Hennig and others.

BUTLER, PA.—The Standard Steel Car Co. plans the erection of a 2-story plant addition, 45 x 85 feet.

CONSHOHOCKEN, PA.—The John Wood Mfg. Co. plans a storage building, one story, 60 x 350 feet, to cost $75,000.

ERIE, PA.—The Allen Machine Co. plans an addition to its foundry, 60 x 250 feet.

ERIE, PA.—The Skinner Engine Co. will start work soon on an addition to its plant, one story, 60 x 270 feet, to cost $80,000.

ERIE, PA.—The Titan Tool Co. recently was incorporated with a capital stock of $30,000, by John V. Walker, Frank A. Veith, John W. McKean and Charles J. Schwartz.

FOXBURG, PA.—The Rockland Water Power Co. recently was incorporated with a capital stock of $5000, by Charles W. Young, Fred W. Young, Charles M. Hart and Cyril C. Crick.

JEANETTE, PA.—The Universal Tool Co. has been incorporated with a capital stock of $50,000, by William M. Adams, Roy J. Wisner and Charles W. Wright.

LANSDARE, PA.—This city plans improvements to its light plant.

LANCASTER, PA.—The Templeton Mfg. Co. has been organized to manufacture machinery and parts, by F. S. Templeton and others.

New England States

BOSTON.—The Alsatian Machine Works, Ltd., has been incorporated to build machinery with $300,000 capital by John L. Coon, Wakefield, Mass., William P. Homans and Edward W. Atkinson, Brookline, Mass.

BOSTON.—The Moback Tool & Machine Mfg. Corp. recently was incorporated with a capital stock of $100,000, by Raymond D. Smith, Waltham, Mass., M. E. Buchanan, Newton, Mass., and Charles Gustafson, Watertown, Mass.

EAST MILTON, MASS.—The Bassett Machine Works plans a machine shop.

HOLYOKE, MASS.—The Springfield Nokol Oil Burning Co., Inc., has been incoporated to make oil burners with $50,000 capital by Kraig J. Young, Patrick F. Carmody and Harry Mason.

MEDFORD, MASS.—The DeCurtis Permutation Lock Co. has been incorporated to make locks with $25,000 capital by Louis M. Spencer, Malden, Mass., Frederick A. Komlosky and Frank DeCurtis.

QUINCY, MASS.—The Monarch Soot Remover Co., Inc., has been incorporated to deal in metals, etc., with $25,000 capital by Leonard W. Newell, James R. Hooper Jr., Dedham, Mass., and Robert F. Wight, Brookline, Mass.

SPRINGFIELD, MASS.—The Eastern States Willys Light Corp. has been incorporated with a capital stock of $25,000, by Carl L. Stebbins, Kenelm R. Winslow and Ambrose P. Olds.

WORCESTER, MASS.—The Worcester Ornamental Iron Co. has been incorporated with a capital stock of $30,000, by Herman L. Dow and others.

WORCESTER, MASS.—Bids have been closed for the erection of a 2-story, 87 x 123-foot garage for the Conroy Motor Co. About 130 tons of steel will be required.

NASHUA, N. H.—The Nashua Mfg. Co. plans alterations to its boiler house.

TILTON, N. H.—Plans are being prepared for an addition to the plant of the General Lens Co.

BRISTOL, R. I.—The National India Rubber Co. has let the contract for a 2-story, 100 x 180-foot addition to its plant.

PROVIDENCE, R. I.—The Auto Metal Co. has been incorporated to make radiators, auto parts, etc., with a capital stock of $50,000, by Louis Balotow, Charles Balotow and Abraham Gornhoff.

HARTFORD, CONN.—Contracts will be closed shortly on a $125,000 machine shop for the board of contract and supply of this city. The structure will be 2-stories, 50 x 120 feet.

NORWALK, CONN.—The American Insulating Co. has purchased a site here on which to erect a 2-story factory building.

Central States Activity

GREEN BAY, WIS.—Fire damaged the plant of the Economy Tool Co., 125 North Broadway.

GREEN BAY, WIS.—The Interstate Coal & Dock Co., which is making extensive improvements in its dock and equipment, has increased its capital stock from $150,000 to $300,000.

GREEN BAY, WIS.—The American Auto Body Co.

(*Concluded on Page* 1238)

FARRELL-CHEEK

STEEL CASTINGS

Is This a Department of Your Plant?

It is for hundreds of the most critical and closest buyers of steel castings in this country.

Only the cleaning floor department of this huge foundry is shown here but efficiency reigns equally supreme in every division.

Why not make it a part of your plant—without the expense and worry of its management.

Farrell-Cheek Steel Foundry Co.

Sandusky, Ohio, U. S. A.

Local Representatives and Offices: Cleveland, Ohio, and New York City

Makers of Steel Castings that are a little better— than the next best —

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Scrap Prices

CORRECTED TO TUESDAY NOON GROSS TONS DELIVERED TO CONSUMER

Steel Works Scrap

HEAVY MELTING STEEL

Pittsburgh	$27.00 to 27.50
Chicago	20.50 to 21.00
Eastern Pennsylvania	23.50 to 24.00
Cleveland	24.25 to 24.75
St. Louis	20.00 to 20.50
Buffalo	24.00 to 25.00
New York (dealers)	18.00 to 19.00
Birmingham	18.00 to 20.00
Cincinnati	22.00 to 22.50
Valleys	25.00 to 25.50
Boston (dealers)	16.00 to 17.00
Detroit	21.00 to 22.00

BUNDLED SHEETS

Pittsburgh	$16.50 to 17.50
Eastern Pennsylvania	17.00 to 17.50
Cleveland	14.00 to 14.50
Buffalo	15.50 to 16.00
Cincinnati	15.00 to 16.00
St. Louis	10.00 to 10.50

STEEL RAILS SHORT

Chicago	$23.50 to 24.00
Boston (dealers)	20.00 to 21.00
Cleveland	22.00 to 23.00
St. Louis	22.00 to 22.50
Birmingham	18.00 to 20.00
Cincinnati	27.00 to 28.00
Detroit	23.00

STOVE PLATE

Pittsburgh	$30.00 to 31.00
Chicago	27.50 to 28.00
Eastern Pennsylvania	25.50 to 26.50
Cleveland	28.00 to 28.50
Detroit	26.00 to 27.00
Birmingham	24.00 to 25.00
Buffalo	30.00 to 31.00
New York	23.50 to 24.00
St Louis	24.00 to 24.50
Cincinnati ⅛	26.50 to 27.00
Boston (consumers)	25.50 to 26.00

LOW PHOSPHORUS

Pittsburgh, billet and bloom crops	$33.00 to 34.00
Eastern Penn. (guaranteed)	33.00 to 34.00
Buffalo	32.00 to 32.50

SHOVELING STEEL

Chicago	$20.00 to 20.50
St. Louis	19.50 to 20.00

KNUCKLES, COUPLERS AND SPRINGS

Pittsburgh	$31.50 to 32.00
Chicago	23.50 to 24.00
St. Louis	22.00 to 22.50
Eastern Pennsylvania	28.00 to 29.00

COMPRESSED SHEETS

Pittsburgh	$23.00 to 23.00
Chicago	16.50 to 17.00
Detroit	14.00 to 15.00
Buffalo	22.50 to 23.00

FROGS, SWITCHES, GUARDS

Chicago	$20.50 to 21.00
St. Louis	20.00 to 20.50
Eastern Pennsylvania	23.00

BOILER PLATE, CUT

Detroit	$15.00 to 16.00
St. Louis	14.00 to 14.50

ANGLE BARS—STEEL

Chicago	$22.50 to 23.00
St. Louis	21.00 to 21.50

Iron Mill Scrap

RAILROAD WROUGHT

Pittsburgh, No. 1	$31.00 to 31.50
Pittsburgh, No. 2	27.00 to 27.50
Chicago, No. 1	21.50 to 22.00
Chicago, No. 2	21.50 to 22.00
Eastern Pennsylvania No. 1	27.00 to 28.00
Cleveland, No. 1	28.50 to 29.00
St. Louis, No. 1	21.50 to 22.00
St. Louis, No. 2	19.00 to 19.50
Buffalo	31.50 to 32.50
Cincinnati	26.00 to 27.00
Birmingham, No. 1	18.00 to 20.00
New York No. 1 (dealers)	26.00 to 27.00
Boston (dealers)	22.00 to 23.00

WROUGHT PIPE

Eastern Pennsylvania ¾	$21.00
Buffalo	19.00 to 20.00
New York (dealers)	16.00 to 17.00
Boston (dealers)	17.00 to 18.00

YARD WROUGHT

Eastern Pennsylvania, No. 1	$25.00 to 26.00

CITY WROUGHT

New York, long (dealers)	$22.50 to 23.00

BUSHELING

Chicago, No. 1	$19.75 to 20.25
Chicago, No. 2	10.75 to 11.25
Cleveland, No. 1	20.50 to 21.00
Cleveland, No. 2	16.75 to 17.25
St. Louis, No. 1	19.00 to 19.50
Buffalo No. 1	19.00 to 20.00
Cincinnati, No. 1	20.00 to 21.00
Eastern Pennsylvania, No. 1	17.00 to 18.00
Detroit No. 2	12.00 to 12.50

MACHINE SHOP TURNINGS

Pittsburgh	$15.00 to 15.50
Chicago	8.50 to 9.00
Eastern Pennsylvania	18.00 to 19.00
Cleveland	11.75 to 12.00
Buffalo	14.00 to 15.00
New York (dealers)	13.50 to 14.00
St. Louis	9.00 to 9.50
Detroit	9.50 to 10.50
Cincinnati	10.00 to 11.50
Birmingham	11.00 to 13.00
Valleys	12.75 to 13.00
Boston (dealers)	12.00 to 13.00

CAST IRON BORINGS

Pittsburgh	$17.50 to 18.50
Chicago	12.00 to 12.50
Eastern Pennsylvania	22.50 to 23.50
Eastern Pennsylvania (chemical)	23.00 to 24.00
Cleveland	16.00 to 16.50
St. Louis	12.00 to 12.50
Detroit	14.00 to 15.00
Buffalo	18.00 to 19.00
New York (dealers' price)	16.50 to 17.00
Cincinnati	13.50 to 14.50
Birmingham	11.00 to 13.00
Valleys	17.50 to 18.00
Boston (dealers)	15.00 to 16.00

MIXED BORINGS AND TURNINGS
(For blast furnace use)

Eastern Pennsylvania	$17.00 to 18.00
Boston (dealers)	13.00 to 14.00
Cleveland	16.00 to 16.50

IRON AXLES

Pittsburgh	$52.00 to 53.00
New York (dealers)	43.00 to 44.00
Chicago	43.50 to 44.00
Eastern Pennsylvania	45.00 to 46.00
Detroit	37.00
Cleveland	46.00 to 47.00
St. Louis	40.00 to 40.50
Buffalo	41.00 to 42.00
Cincinnati	36.00 to 37.00
Birmingham	25.00 to 27.50

IRON RAILS

Chicago	$33.50 to 34.00
Cleveland	31.00 to 32.00
St. Louis	30.00 to 31.00
Buffalo	31.00 to 32.00
Cincinnati	26.00 to 27.00

PIPES AND FLUES

Chicago	$16.00 to 16.50
Cleveland	22.50 to 23.00
Detroit	16.00
St. Louis	16.00 to 16.50
Cincinnati	18.00 to 19.00

GRATE BARS

Chicago	$26.00 to 26.50
Cleveland	29.00 to 30.00
Detroit	24.00 to 25.00
Buffalo	24.00 to 25.00
New York	23.00 to 24.00
Eastern Pennsylvania	29.00 to 30.00

FORGE FLASHINGS

Cleveland, large	$20.00 to 21.00
Chicago, small	18.00 to 18.50
Cleveland, small	18.00 to 19.00
Boston (dealers)	12.00 to 13.00
Detroit	19.00 to 20.00

FORGE SCRAP

Chicago	$21.00 to 22.00
Eastern Pennsylvania, No. 1	17.00 to 18.00
Boston	12.00 to 13.00

ARCH BARS AND TRANSOMS

Chicago	$38.00 to 38.50
St. Louis	31.00 to 31.50

ANGLE BARS—IRON

Chicago	$34.00 to 34.50
St. Louis	28.00 to 28.50

Iron and Steel Works Scrap

AXLE TURNINGS

Pittsburgh	$22.00 to 23.00
Eastern Pennsylvania	21.00 to 22.00
Boston (dealers	15.00 to 15.50
St. Louis	12.00 to 12.50
Detroit	$18.00 to 19.00
Cleveland	18.00 to 19.00
Buffalo	19.00 to 20.00
Chicago	17.00 to 17.50

STEEL CAR AXLES

Pittsburgh	$43.00 to 44.00
Eastern Pennsylvania	40.00
Cleveland	37.00 to 38.00
St. Louis	32.00 to 32.50
Buffalo	41.00 to 42.00
Chicago	36.50 to 37.00
New York (dealers)	31.00 to 31.50
Birmingham	26.00 to 28.00
Boston (dealers)	30.00 to 31.00
Detroit	32.50

SHAFTING

Eastern Pennsylvania	$32.00 to 33.00
St. Louis	30.00 to 30.50
New York (dealers)	25.00 to 26.00
Chicago	34.00 to 34.50
Boston (dealers)	28.00 to 28.00

Iron Foundry Scrap

CAR WHEELS

Pittsburgh, iron	$43.00 to 44.00
Pittsburgh, steel	28.00 to 29.00
Chicago, iron	36.00 to 36.50
Eastern Pennsylvania, iron	41.00 to 42.00
Cleveland, iron	35.00 to 36.50
St. Louis, iron	33.00 to 33.50
Buffalo, iron	38.00 to 39.00
Birmingham, iron	28.00 to 30.00
Birmingham, tram car	28.00 to 30.00
Boston (consumers)	33.00 to 34.00
Cincinnati	30.00 to 31.00
New York, iron	36.00 to 37.00
Detroit	30.00

NO. 1 CAST SCRAP

Pittsburgh, cupola	$40.00 to 41.00
Chicago, cupola	31.00 to 31.50
Eastern Pennsylvania, cupola	38.00 to 39.00
Cleveland, cupola	38.50 to 39.00
New York cupola (dealers)	35.00 to 36.00
Cincinnati, No. 1, machinery cupola (net)	34.00 to 35.00
Detroit	34.00 to 35.00
Birmingham, cupola	31.00 to 31.00
St. Louis, railroad	31.00 to 31.50
St. Louis, agricultural	30.00 to 30.50
Buffalo	38.00 to 39.00
Boston (consumers)	40.00 to 42.00
Valleys	39.00 to 40.00

HEAVY CAST

New York (dealers)	$34.00 to 35.00
Buffalo	27.00 to 28.00
Pittsburgh	33.00 to 34.00
Cleveland	29.00 to 29.50
Boston (consumers)	35.00 to 37.00

MALLEABLE

Pittsburgh, railroad	$29.00 to 30.00
Pittsburgh, agricultural	30.00 to 31.00
Chicago, railroad	26.50 to 27.00
Chicago, agricultural	26.00 to 26.50
Eastern Pennsylvaina, railroad	28.00 to 29.00
Cleveland, railroad	31.00 to 32.00
Cleveland, agricultural	26.00 to 27.00
St. Louis, railroad	22.00 to 22.50
St. Louis, agricultural	21.00 to 21.50
Cincinnati, railroad	29.00
Cincinnati, agricultural	28.00 to 29.00
Boston, railroad	28.00 to 29.00
Buffalo	30.00 to 31.00
Detroit	28.00 to 29.00

Miscellaneous Scrap

RE-ROLLING RAILS
5 feet and over

Pittsburgh district	$38.00 to 39.00
Chicago	31.00 to 33.00
Eastern Pennsylvania	38.00 to 39.00
Cleveland	33.00 to 34.00
St. Louis	31.00 to 31.50
Birmingham	30.00 to 32.00
Boston (dealers)	32.00 to 33.00

LOCOMOTIVE TIRES

Chicago	$19.50 to 20.00
St. Louis	18.00 to 18.50

BOILER PUNCHINGS

Chicago	$24.50 to 25.00
Eastern Pennsylvania	27.00 to 28.00

Millco Service

Millco Service has made many friends for us in the Iron and Steel Scrap field. We are now prepared to extend that service to also cover your requirements of

Ferro-Alloys

and Pig Iron - Fluor Spar - Fuel Oil - Babbitt - Aluminum. Drop us a line for attention of Mr W. K. Kenly.

"MILLCO" SERVICE

Ask us for prices on Manganese Scrap.

The James D. Miller Company
McCormick Bldg Chicago

(*Continued from Page* 1234)

has been organized by John Perry, Willard and Earl Fraser, Appleton, Wis., and will equip a plant in the former shop of the Key Calk Horseshoe Co., to have an initial capacity of 10 bodies a day.

JEFFERSON, WIS.—A tire and rubber goods manufacturing plant costing $75,000 will be erected by the Jefferson Realty Co. for the use of the Jefferson Rubber Co., which has been incorporated with a capital stock of $300,000, by R. W. Lyons and others.

LA CROSSE, WIS.—Articles of incorporation have been filed by the Kane Klutch Corp., a $200,000 concern, which will manufacture patented transmission devices and other auto parts. The promoters are C. S. Cone, G. O. Stoffel and G. W. Bunge.

MADISON, WIS.—The Standard Oil Co. will build a tank storage, warehouse and garage at a cost of $65,000. A site has been purchased.

MARIBEL, WIS.—A machine shop, 40 x 80 feet will be erected by Theodore Salzsieder, who has been engaged in the general machinery repair business for the past year.

MARIBEL, WIS.—Henry A. Elmer, inventor of farm implements, has organized the Maribel Straw Cutter Mfg. Co., capitalized at $50,000, to build a plant for the manufacture of machines of cutting straw.

MILWAUKEE.—Fire damaged the plant of the Crucible Steel Casting Co., 612 Clinton street.

MILWAUKEE.—The Rockwell Mfg. Co., Sixth avenue and Park street, is erecting a new dock, 58 x 220 feet.

MILWAUKEE.—The Simplicity Products Co. is the new corporate name of the Interstate Mfg. Co., organized early this year and conducting a general metal products plant at Twenty-ninth street and Meinecke avenue.

OCONTO, WIS.—The Montana Tractor Co. plans a plant, one story, 156 x 200 feet, at a cost of $150,000.

OSHKOSH, WIS.—A former shop building at 83 High street has been taken over by John Juul and Albert Peterson, who are adding equipment for the manufacture of brass table lamps and other metal products.

SHEBOYGAN, WIS.—Walter and Otto Lienau, who have been engaged in the brass and aluminum casting business for some time past, have incorporated the firm as the Lienau Brass & Aluminum Foundry, Inc., with a capital stock of $25,000.

TWO RIVERS, WIS.—Fire damaged the power plant of the Wisconsin Basket & Pail Co. John F. Conant is president.

WAUSAU, WIS.—Local capital has become interested in the Balanced Valve Motor Co., a $300,000 corporation formed at Milwaukee a year ago. The common council will furnish a 2-acre site with two acres additional upon fulfillment of contract conditions. It is planned to start work on the erection of a plant, 60 x 120 feet, before the end of the year.

WEST BEND, WIS.—The Schmidt & Sterck Wagon Co. plans a plant, one story, 100 x 270 feet, at a cost of $50,000.

ANN ARBOR, MICH.—The Patterson-Cosgrain Mfg. Co. has been incorporated with a capital stock of $5000, by Robert R. Patterson and others, to engage in the manufacture of metal stampings.

CARO, MICH.—The Miller Top & Body Mfg. Co. is erecting a warehouse, 46 x 100 feet.

DETROIT.—The Arthur Colton Co., tool maker, is completing the erection of two additions to its plant.

DETROIT.—The Michigan Alkali Co. has plans for a large alkali plant at Wyandotte, Mich.

DETROIT.—The American Machine Products Co. is erecting a 1-story factory building.

DETROIT.—The Wright-Fisher Bushing Co. has purchased a site on which it plans a plant at Holly, Mich.

DETROIT.—The West Foundry Co. recently was incorporated with a capital stock of $50,000, by C. Howe Crane, Fred G. Dewey, E. Porter West and others.

DETROIT.—The Michigan Marine Motor Co. has been incorporated with a capital stock of $10,000 to manufacture boat engines and equipment, by William L. Murray, 1425 Jefferson avenue, and others.

DETROIT.—The Superior Combustion Engine Co. has been incorporated with a capital stock of $500,000, by Richard P. Grieve, 315 Casa avenue, and others, to manufacture engines and machines.

DETROIT.—The Tuthill Spring & Service Co. has been organized with a capital stock of $30,000, by W. H. Cochran, 780 Lenox avenue, and others, to manufacture automotive parts.

GRAND RAPIDS, MICH.—The Sterling Furnace Co. has been organized by Charles E. Miller and others, to manufacture heating equipment, with a capital stock of $30,000.

HOLLY, MICH.—The Wright-Fisher Bushing Co. contemplates the erection of a new plant.

JACKSON, MICH.—The Superior Motor Works has been incorporated with a capital stock of $11,000, by Charles Rutzen, and others, to manufacture gasoline motors.

LANSING, MICH.—The Multitool Mfg. Co. has established a plant here for the manufacture of tools, etc. The company is capitalized at $100,000.

LANSING, MICH.—This city has sold $250,000 of 5 per cent bonds, the proceeds of which will be used in the construction of a new waterworks and electric lighting plant.

OWOSSO, MICH.—Plant improvements including a power house, are being hastened by the Field Body Corp.

PONTIAC, MICH.—The Pontiac Foundry & Machine Co. has been reorganized as the Pontiac Iron Works with a capital stock of $30,000.

CHICAGO.—The Chicago Fuse Co. has a permit to erect a shipping platform.

CHICAGO.—The Edward Valve & Mfg. Co. is having plans drawn for a plant to cost $400,000.

CHICAGO.—The Standard Electric Mfg. Co. contemplates a plant building, two stories, 124 x 161 feet, to cost $200,000.

CHICAGO.—The Star Brass Works, 3120 Carroll avenue, plans an addition to its plant, 47 x 159 feet, to cost $11,000.

CHICAGO.—The Alemite Die Casting Co. plans a plant, one story, 150 x 242 feet, to cost about $150,000.

CHICAGO.—The Burn Clean Non-Carbonizing Spark Plug Corp., 4201 Southwestern avenue, has been incorporated by John M. Stemle, Anton W. Koncben and C. K. Harding, to manufacture spark plugs.

CHICAGO.—The Seric Mfg. Co., 29 South La Salle street, has been incorporated by H. I. Charbonneau, William E. Kaiser and G. L. Bishop, to manufacture automobile accessories.

CHICAGO HEIGHTS, ILL.—The Durand Steel Locker Co. has had plans drawn for an addition to its plant, one story.

DECATUR, ILL.—The National Casting & Foundry Co. has had plans drawn for a foundry, 60 x 64 feet, to cost $9000.

DECATUR, ILL.—The U. S. Wire Material Co. plans a warehouse, one story, 50 x 150 feet, to cost about $50,000.

EAST ST. LOUIS, ILL.—The Buell Pressed Steel Co., incorporated with a capital stock of $100,000, has started operations in a plant at Twentieth street and Brady avenue.

STERLING, ILL.—The Northwestern Barb Wire Co. plans a plant, five stories, 48 x 86 feet.

ANDERSON, IND.—The Star Automotive Specialty Co. recently was incorporated with a capital stock of $100,000.

ELKHART, IND.—The Ryan Kellogg Conveyor Corp. recently was incorporated with a capital stock of $200,000.

ASHLAND, O.—The Nokey Lock Co. recently was incorporated with a capital stock of $10,000, by C. B. Meuser, J. G. Breithaupt, C. F. Grain, C. D. Leiter and H. C. Beninghof.

CANTON, O.—The Eggert Chemical Co. has been incorporated with a capital stock of $50,000, by G. B. Eggert, J. C. Callahan, H. S. Mitchell, R. M. Schneider and others.

CINCINNATI.—The Peerless Die & Tool Co. plans a plant building, one story, 40 x 70 feet, to cost $4000.

CLEVELAND.—The Atlas Foundry Co. plans a foundry, 60 x 100 feet, to cost $25,000.

CLEVELAND.—The Joecken Machine Co. recently was incorporated with a capital stock of $5000, by P. J. Joecken, C. Joecken and others.

CLEVELAND.—The Cyclone Fence Co., 1230 East Fifty-fifth street, is having plans drawn for an addition to its plant, one story, 40 x 100 feet.

CLEVELAND.—The National Automotive Mfg. Co. recently was incorporated with a capital stock of $50,000, by J. E. Heens, W. Lester Corbley, J. L. Corbley, E. F. Heens and others.

CLEVELAND.—The Steel Office Equipment Co. recently was incorporated with a capital stock of $10,000, by G. C. Reining, R. G. Morrison, G. A. Robinson, G. B. Folk and E. L. Chester.

CONNEAUT, O.—The Conneaut Shovel Co. is erecting an addition to its plant at an estimated cost of $35,000.

DAYTON, O.—The Larkin Automotive Parts Co. has been incorporated with a capital stock of $100,000, by D. C. Larkin, J. Larkin, E. J. Schaeffer and L. L. Cecil.

WARREN, O.—The General Fire Extinguisher Co. plans a boiler house addition, one story, 30 x 75 feet.

YOUNGSTOWN, O.—The H. & H. Leak Proof Fitting Co. has been incorporated with a capital stock of $10,000, by H. Hain, W. Tumphrey, M. M. Gunlefinger, H. D. Hain and others.

MACDONALD, W. VA.—The New River Co. will erect a machine shop building.

Throughout the West

CLINTON, IOWA.—The Clinton City Gas Co. has started work on a boiler house addition, 1-story, 38 x 45 feet, to cost about $20,000.

KANSAS CITY.—The Kansas City Power & Light Co. will make improvements.

NEVADA, MO.—The Norman Sheet Metal Mfg. Co. has plans for an addition to its plant, 1-story, 110 x 188 feet.

ST. LOUIS.—The plant of the St. Louis Car Co. recently was damaged by fire.

ST. LOUIS.—The St. Louis Pump & Equipment Co. has been organized by John C. Roberts, Charles C. Frederick and others. It has leased a temporary plant.

ST. LOUIS.—The St. Louis Malleable Castings Co. is erecting a foundry building, 100 x 464 feet, at a cost of $600,000.

ST. LOUIS.—The Metallic Industries, Inc., 2209 Pine street, G. C. Hosch president, will build a plant costing $100,000.

HENRYETTA, OKLA.—The General Machinery & Supply Co. contemplates a machine shop.

EL DORADO, ARK.—The Chicago, Rock Island &

(*Concluded on Page* 1242)

NATIONAL TUBE COMPANY—CONTINENTAL PLANT—PITTSBURGH, PENNA.

It is not always necessary to build a new building for your

INDUSTRIAL CAFETERIA

The above CAFETERIA was installed in an old warehouse and is an example of harmony and beauty with symmetric appearance, well ventilated and roomy.

The idea of converting this warehouse into an efficient INDUSTRIAL CAFETERIA was promoted by Mr. M. Rosenkranz, Engineer.

May we call and explain?

Equipment by

THE RUSS MANUFACTURING COMPANY

Cleveland, Ohio

Installed and organized by

THE WILLCOX SYSTEM

333 The Arcade Cleveland, Ohio

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Iron Ore

Superior Ores, Per Ton, Lower Lake Ports

Old range Bessemer, 55 per cent iron	$7.45
Mesabi Bessemer, 55 per cent iron	7.20
Old range nonbessemer, 51½ per cent iron	6.70
Mesabi nonbessemer, 51½ per cent iron	6.55

Port Henry Iron Ore, f.o.b. Port Henry

Old bed 21 furnace	$5.80
Old bed concentrates, 63 per cent	6.70
Harmony, cobbed, 63 per cent	6.70
New bed, low phos., 65 per cent	9.50
Lump ore for fix	7.00

Manganese Ore

Brasilian, 48 to 50 per cent, c.i.f. Atlantic ports, 60 cents per unit, nominal.

Indian 48 to 50 per cent, c.i.f. Atlantic Atlantic ports, 60 cents per unit, nominal.

Caucasian, 48 to 50 per cent, f.o.b. cars, ports, 60 cents per unit, nominal.

FLUOR SPAR

Washed gravel Kentucky and Illinois mines, per ton $25.00

Warehouse Prices

Steel bars, Boston	5.50c to 6.00c
Steel bars, Chicago	3.48c to 3.98c
Steel bars, Cleveland	3.34c to 4.00c
Steel bars, Detroit	4.485c
Steel bars, Philadelphia	4.75c
Steel bars, Phila., ½ inch and smaller	6.00c
Steel bars, New York	4.75c
Steel bars, St. Louis	3.57½c to 4.07½c
Steel bars, Cincinnati	5.00c to 6.00c
Steel bars, St. Paul	3.76c to 4.50c
Steel bars, Buffalo	4.65c
Iron bars, Boston	5.50c
Iron bars, Buffalo	5.26c
Iron bars, Chicago	3.98c to 4.61c
Iron bars, Detroit	4.485c
Iron bars, St. Louis	4.07½c to 4.50c
Iron bars, Cincinnati	4.50c
Iron bars, Philadelphia	5.50c
Iron bars, New York	4.75c
Shapes, Chicago	3.58c to 4.08c
Shapes, Detroit	4.18c
Shapes, Boston	5.00c
Shapes, St. Louis	3.67½c to 4.17½c
Shapes, St. Paul	3.86c to 4.385c
Shapes, New York	4.30c to 5.00c
Shapes, Cleveland	3.44c
Shapes, Philadelphia	4.50c
Shapes, Phila., smaller than 3 inch	5.00c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.50c
Plates, Buffalo	4.30c
Plates, Chicago	3.78c to 4.28c
Plates, Detroit	4.33c
Plates, Boston	4.75c to 5.50c
Plates, St. Louis	3.875c to 4.375c
Plates, St. Paul	4.06c to 4.865c
Plates, New York	4.50c to 4.75c
Plates, Cleveland	3.64c
Plates, Phila., ¼-inch and heavier	4.50c
Plates, Phila., ¼-inch	5.00c
Plates, Cincinnati	6.00c
No. 10 blue anl. sheets, N. Y.	7.25c to 8.00c
No. 10 blue anl. sheets, Phila.	7.25c
No. 10 blue anl. sheets, Chicago	4.68c to 7.13c
No. 10 blue anl. sheets, Cleveland	6.75c
No. 10 blue anl. sheets, Boston	7.80c
No. 10 blue anl. sheets, Buffalo	7.15c
No. 10 blue anl. sheets, Detroit	6.95c
No. 10 blue anl. sheets, St. L.	7.22½c
No. 10 blue anl. sheets, Cincinnati	7.50c
No. 10 blue anl. sheets, St. Paul	7.25c
No. 28 black sheets, Chicago	5.73c to 8.11c
No. 28 black sheets, New York	8.60c to 9.00c
No. 28 black sheets, Phila.	9.00c
No. 28 black sheets, Cleveland	6.75c to 8.50c
No. 28 black sheets, Boston	9.15c
No. 28 black sheets, Cincinnati	9.00c
No. 28 black sheets, Detroit	8.00c
No. 28 black sheets, St. Louis	8.20c
No. 28 black sheets, St. Paul	6.00c to 8.39c
No. 28 black sheets, Buffalo	9.10c
No. 28 galv. sheets, Chicago	9.61c
No. 28 galv. sheets, New York	9.85c to 10.50c
No. 28 galv. sheets, Phila.	11.00c
No. 28 galv. sheets, Boston	10.50c
No. 28 galv. sheets, Cleveland	9.00c to 9.50c
No. 28 galv. sheets, Cincinnati	9.00c
No. 28 galv. sheets, Detroit	10.00c
No. 28 galv. sheets, Buffalo	10.60c
No. 28 galv. sheets, St. Louis	9.60c
Bands, New York	6.48c to 7.11c
Bands, Boston	8.00c
Bands, Detroit	5.785c
Bands, Buffalo	6.35c
Hoops, Buffalo	6.60c
Hoops, Boston	9.00c
Hoops, New York	6.68c to 7.61c
Hoops, Detroit	6.535c
Cold rolled shafting, Buffalo	6.00c
Cold Rolled Shafting, New York	6.36c to 8.11c
Cold rolled shafting, Boston	8.03
Cold rolled flats, squares and hexagons, New York	6.86c to 8.61c
Cold rolled rounds	6.36c to 8.11c
Cold rolled rounds, Detroit	5.70c

Mill Sheet Schedule

Black

Differentials for gage, per 100 pounds

No. 30	+20c
No. 29	+10c
No. 28 (carloads)	Base
No. 27	—05c
Nos. 25-26	—10c
Nos. 22-24	—15c
Nos. 17-21	—20c
Nos. 15-16	—25c
Nos. 13-14	—30c
Nos. 10-12	—35c

Standard Sizes

Gages Nos. 12 to 30 inclusive, 24, 26, 28 and 30 inches wide by 72, 84, 96 and 120 inches long. Gages Nos. 14 to 28 in addition to the foregoing, 36 wide by 96 inches and 120 inches long. Extras for width and length to be added.

Freight Rates

Effective Aug. 26 but subject to revision by official tariffs

PIG IRON

Mahoning and Shenango valleys to:

Cleveland	$1.96
Newark, N. J.	6.72
Boston	7.28
Philadelphia	6.32
Pittsburgh	1.96
St. Louis	6.44
Minneapolis, St. Paul	7.60

Buffalo to:

Albany, N. Y.	$2.52
New England (rail)	5.46
New York and Brooklyn (rail)	5.46

Virginia furnaces to:

Philadelphia	$5.74
New England	6.26½
Brooklyn, Jersey City, Newark	6.16

Birmingham, Ala., to:

Boston	$10.665
Cincinnati	4.50
Chicago	6.66
Cleveland	6.66
Louisville, Ky.	4.12
Minneapolis, St. Paul	9.73
New York	10.26
Philadelphia	8.665
Pittsburgh	7.60
Savannah, Ga.	4.25
St. Louis	5.375

Chicago to:

Des Moines	$4.725
Minneapolis, St. Paul	2.375
Milwaukee	.89
Moline, Ill.	1.89
Omaha	6.07
St. Louis	2.725

Ironton and Jackson, O., to:

Chicago	$5.32
Cincinnati	2.52
Cleveland	3.36
Detroit	3.64
Indianapolis	3.22
Minneapolis, St. Paul	8.40

FINISHED MATERIAL

Pittsburgh, carloads, per 100 lbs., to:

New York	38.0 cents
Philadelphia	35.0 cents
Boston	41.5 cents
Buffalo	29.5 cents
Baltimore	33.5 cents
Cleveland	24.0 cents
Cincinnati	32.0 cents
Chicago	38.0 cents
Detroit	32.0 cents
Minneapolis and St. Paul	66.0 cents
Denver	$1.32
St. Louis	47½ cents
New Orleans	51.5 cents
Birmingham	76.5 cents
Pacific coast (all rail)	$1.665
Pacific coast (tin plate)	1.665

GALVANIZED AND LONG TERNE

No. 30	+50c
No. 29	+25c
No. 28 (carloads)	Base
No. 27	+15c
Nos. 25-26	—30c
Nos. 22-24	—45c
Nos. 17-21	—60c
Nos. 15-16	—75c
Nos. 12-14	—90c
Nos. 10-11	—1.00

Standard Sizes

Gages Nos. 12 to 30 inc., 24, 26, 28, 30 and 36 in. wide by 72, 84, 96 and 120 in. long. Extras for width and length to be added.

BLUE ANNEALED

Differential for gage for 100 pounds

Nos. 8 and heavier	— 5c
Nos. 9 and 10 (carloads)	Base
Nos. 11 and 12	+ 5c
Nos. 13 and 14	+10c
Nos. 15 and 16	+20c

Standard Sizes

Widths—24-26-28-30-36 and 48 inches.
Lengths—72-84-96-120 and 144 inches.
Extras for width and length to be added.

Tubular Goods

Pittsburgh basing discounts to jobbers in carloads.

Steel Pipe

STANDARD WEIGHT

	Black	Galvanized
Butt Weld		
⅛, ¼ and ⅜-inch	47 to 50½	20½ to 24
½-inch	51 to 54½	36½ to 40
⅝ to 3-inch	54 to 57½	40½ to 44
Lap Weld		
2-inch	47 to 50½	34½ to 38
2½ to 6-inch	50 to 53½	37½ to 41
7 to 12-inch	47 to 50½	33½ to 37
13 to 14-inch	37½ to 41	
15-inch	35 to 38½	

PLUGGED AND REAMED

Butt Weld		
1 to 3-inch	52 to 55½	38½ to 42
Lap Weld		
2-inch	45 to 48½	32½ to 36
2½ to 6-inch	48 to 51½	35½ to 39

EXTRA STRONG PLAIN ENDS

Butt Weld		
⅛, ¼ and ⅜-inch	43 to 46½	25½ to 29
½-inch	48 to 51½	35½ to 39
⅝ to 1½-inch	52 to 55½	39½ to 43
2 to 3-inch	53 to 56½	40½ to 44
Lap Weld		
2-inch	45 to 48½	33½ to 37
2½ to 4-inch	48 to 51½	36½ to 40
4½ to 6-inch	47 to 50½	35½ to 39
7 to 8-inch	43 to 46½	29½ to 33
9 to 12-inch	38 to 41½	24½ to 28

DOUBLE EXTRA STRONG PLAIN

	Butt Weld	Lap Weld
½-inch	39 to 42½	28½ to 32
¾ to 1½-inch	42 to 45½	31½ to 35
2 to 2½-inch	44 to 47½	33½ to 37
2-inch	37 to 40½	27½ to 31
2½ to 4-inch	39 to 42½	29½ to 33
4½ to 6-inch	38 to 41½	28½ to 32
7 to 8-inch	33 to 36½	19½ to 23

Wrought Iron Pipe

Pittsburgh basing discounts to jobbers in carloads

THREADS AND COUPLINGS

	Butt Weld	Lap Weld
⅛-inch	+	+ 35
¼-inch	15½ to 25½	+ 1½ to 11½
⅜-inch	19½ to 29½	1½ to 11½
¾ to 1½-inch	24½ to 34½	8 to 18¼
2-inch	20½ to 28½	6½ to 14½
2½ to 6-inch	22½ to 30½	9½ to 17¾
7 to 12-inch	19½ to 27½	6½ to 14½

PLUGGED AND REAMED

Two points less than above

EXTRA STRONG PLAIN ENDS

	Black	Galvanized
Butt Weld		
⅛-inch	+	9 + 35
¼-inch	13½ to 23½	6½ to +3½
⅜-inch	18½ to 28½	5½ to 15¾
¾ to 1½-inch	24½ to 34½	9½ to 19¾
Lap Weld		
2-inch	21½ to 29½	8½ to 16¼
2½ to 4-inch	23½ to 31½	11½ to 19¾
4½ to 6-inch	22½ to 30½	10½ to 18¾
7 and 8-inch	14½ to 22½	2½ to 10¾
9 and 12-inch	9½ to 17½	5½ to +3¾

DOUBLE EXTRA STRONG, PLAIN ENDS

	Butt Weld Black	Galv.
½-inch	15½ to +39½	3½ to +51½
¾-inch	20½ to +23½	8½ to +34½
1-inch	+36½	+50½
1¼-inch	+22½	+34½
1½-inch	+21½	+33½
	Lap Weld	
2-inch	16½ to + 7½	4½ to +10½
2½ to 4-inch	18½ to + 2½	9½ to +11½

Find Out How Much It Will Cost to Get a Link-Belt Silent Chain Drive to Fit Your Conditions

For your convenience in getting a quotation on a Link-Belt Silent Chain Drive for that lineshaft, or machine in your plant, fill out the coupon and mail it to us. Our experienced engineers will determine the correct drive for your purpose and mail you complete information and the cost of the drive.

Link-Belt Silent Chain is 98.2% efficient (on actual test). It is positive, runs on long or short centers, and "Safety First" protection is provided by our patented dust proof and oil tight casings.

Write for our Link-Belt Silent Chain price list data book No. 125, showing how to figure drives and determine prices yourself. Write today for a copy.

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

New York	299 Broadway	Kansas City, Mo.	306 Elmhurst Bldg.
Boston 9	49 Federal St.	Seattle	820 First Ave., S.
Pittsburgh	1501 Park Bldg.	Portland, Ore.	First and Stark Sts.
St. Louis	Central Nat'l Bk. Bldg.	San Francisco	168 Second St.
Buffalo	547 Ellicott Square	Los Angeles	163 N. Los Angeles St.
Wilkes-Barre	2d Nat'l Bk. Bldg.	Toronto, Can.	Canadian Link-Belt Co., Ltd.
Huntington, W. Va.	Robson-Prichard Bldg.	Denver	Lindrooth, Shubart & Co., Boston Bldg.
Cleveland	429 Kirby Bldg.	Louisville, Ky.	Frederick Wehle, Starks Bldg.
Detroit	4210 Woodward Ave.	New Orleans	C. O. Hinz, Hibernia Bank Bldg.
Minneapolis	418 S. Third St.	B'm'gham, Ala.	S. L. Morrow, 720 Brown-Marx Bld.
Charlotte, N. C.	J. S. Cothran, Com'l Bank Bldg.		

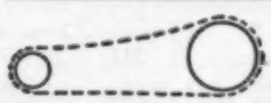
Link-Belt Company 910 S. Michigan Ave. Chicago, Ill. (Date)_____

Please send us quotation for a Silent Chain Drive to operate_____
We give the following to enable you to figure closely:

Maximum H-P to be transmitted_____
Dis. from center to center of shafts_____

	DriveR	DriveN
Diam. of shaft		
Revolutions per minute		
Max. Wheel Diam.		
Max. Wheel Width (Space on Shaft)		
Split, Yes or No		
Key Seat		

Is the load steady, or intermittent as with pumps?_____
Is the chain used in a clean or dirty place?_____
Is the chain subject to shock?_____
How many hours per week will it operate?_____
What percentage of time at full load?_____
Are there means of adjusting centers?_____
If there is a longitudinal float or movement, give amount_____
If to replace belt, other chain or gears, describe same_____



Indicate Position of Drive and Direction of Rotation
Mark DriveR wheel "R"
Mark DriveN wheel "N"
Draw line showing relative position of floor

*Name*_____
*Street Address*_____
*Town and State*_____

☐ Please send us literature on the Link-Belt Silent Chain Drive [I. T. R.

(*Continued from Page* 1238)

Pacific railroad, plans a roundhouse, shop, and other buildings.

GALENA, KANS.—The Eagle-Picher Lead Co., Joplin, Mo., plans improvements to its plant here at a cost of $75,000.

OMAHA, NEB.—The plant of the Omaha Body Co., 1529 North Sixteeth street, recently was damaged by fire. It is planned to rebuild the plant.

SIDNEY, NEBR.—The city will build a waterworks system costing $125,000. R. D. Salisbury, 1415 East Colfax avenue, Denver, is engineer.

AMARILLO, TEX.—This city plans to improve its electric light and water plants.

AMARILLO, TEX.—It is planned by the Willborn Bros. Tank Mfg. Co., to install machinery in its plant for the manufacture of welded tanks, etc.

AMARILLO, TEX.—The Gruver Threshing Machine Co. has been incorporated with a capital stock of $30,000, by P. F. Gruver, G. C. Fairey and others.

BALLINGER, TEX.—This city plans to erect an electric light plant.

BEAUMONT, TEX.—The Beaumont Shipbuilding & Dry Dock Co. plans a machine shop at a cost of $100,000.

DALLAS, TEX.—The Gulberson Corp., oil well tools, etc., plans a plant addition, 25 x 100 feet, to be equipped as a machine shop.

DALLAS, TEX.—The Clarke Sanding Machine Co. has been incorporated with a capital stock of $1,000,000, by A. A. Clarke, A. V. J. Hagen and J. J. Madigan.

DALLAS, TEX.—The Martin Wright Electric Co. has been incorporated with a capital stock of $20,000, by Martin Wright, E. B. Zoller and L. B. French.

EL PASO, TEX.—The National Jewelry Co. has been incorporated with a capital stock of $10,000, by F. N. and M. Hall, and Bernad Mack.

FT. WORTH, TEX.—The Southwestern Stee. & Iron Co. has been organized by J. B. Lowry, S. H. Hord, and plans to erect a building.

FT. WORTH, TEX.—W. C. Ellis will erect a factory and assembling plant.

HOUSTON, TEX.—The Gray Engineering Works is reported planning a foundry building.

HOUSTON, TEX.—The Cameron Iron Works, 711 Milby street, has been organized by H. S. Cameron and others.

KINGSVILLE, TEX.—The St. Louis, Brownsville & Mexico railroad will rebuild its burned round house and machine shops.

LAREDO, TEX.—The Laredo Bridge Co. has plans prepared for an international bridge over the Rio Grande, at a cost of $300,000.

MEMPHIS, TEX.—Fred Miller of Hollis, Okla., will build an electric light and power plant here.

SAN BENITO, TEX.—The San Benito Electric Light & Power Co. has been incorporated with a capital stock of $50,000, by J. T. Lomax, C. G. Malott and R. M. Graeter.

PORTLAND, OREG.—The Peacock Mill Co. plans a power plant at a cost of $140,000.

ROSEBURG, OREG.—The Automatic Electric Brake Co. has purchased the plant of the Automatic Mfg. Co., and will enlarge it for the manufacture of electric brakes and automobile trailers.

Business in Canada

MONTREAL, QUE.—The Dunwin Motors, Ltd., have been incorporated to manufacture engines, motors, machinery, etc., with $100,000 capital stock; by Albert G. B. Clarton, Thomas R. Ker, Frederick G. Ramsden and others.

MONTREAL, QUE.—The British Radio Corp. of America, Ltd., has been incorporated to manufacture wireless telegraph and telephone apparatus, electrical machinery and equipment, etc., with $10,000 capital stock; by William L. Bond, Lucien Beauregard, John B. Johnson and others.

MONTREAL, QUE.—The Automotive Engineering Co., Ltd., has been incorporated to enter into business as engineers, iron and brass founders, steam, electric and other engine manufacturers, machinists, boiler makers, etc., with $500,000 capital stock; by Louis P. Crepeau, Maurice Dugas, S. H. R. Bush and others.

HAMILTON, ONT.—The Dominion Lock Joint Pipe Co., Ltd., has been incorporated with a capital stock of $50,000, by C. V. Langs, E. G. Binkley, Howard Morwick and others.

HAMILTON, ONT.—The plant of the Equator Mfg. Co., Bay street, was damaged by fire Oct. 18, with a loss of $25,000 to building and machinery. The company manufactures electrical equipment. The premises of the Hamilton Lamp Co., 146 York street, the machine shop of the M. F. Ireland, 150 York street and other buildings were also damaged.

WELLAND, ONT.—The Joseph Stokes Rubber Co. is said to have awarded a contract for a 1-story rubber mill and power house, to cost $100,000.

Business Changes Announced Recently by the Trade

THE Butler Mfg. Co., Indianapolis, now is operating in its large new plant at 3334 West Washington street, Charles R. Butler, president of the company, has announced. The company formerly occupied the factory building at 1124 East Georgia street but increased space was required. It makes a specialty of automobile cylinder regrinding, and the manufacture of piston rings and pins.

* * *

Fairbank & Co., Wade building Cleveland, and Harah building, Uniontown, Pa., announced the opening of a new branch office in Pittsburgh at a temporary location, 528 Jenkins building, with Robert W. Early as resident manager.

* * *

The Sizer Forge Co., 244 Larkin street, Buffalo, has reopened its Pittsburgh sales office at 601 Bessemer building, with David A. Stuart in charge.

* * *

The New York office of the National Engineering Co., Machinery Hall building, 549 West Washington boulevard, Chicago, has been removed from 15 East Fortieth street to 248 Fulton street in charge of its eastern sales manager, S. H. Cleland.

* * *

The Warren Oil Co. of Pennsylvania, has removed its Buffalo office from 77 Main street to 158 Pearl street in the Underhill building.

* * *

The R. H. Beaumont Co., Philadelphia, contracting for conveying and hoisting machinery, and power plant equipment, has established a branch in Pittsburgh in charge of Thomas Widdop.

* * *

C. E. Halback & Co., fabricators of ornamental iron, have removed their office from 23 East Twenty-sixth street, New York, to their new factory at 189-93 Banker street, Brooklyn, N. Y.

* * *

The F. C. Austin Co., Inc., 30 Church street, New York, which recently took over the plant of the Toledo Crane & Bridge Works, Toledo, O., contemplates abandoning the production of cranes and devoting the shop to roadmaking machinery.

* * *

Maruzen Co., Ltd., Tokyo, Japan, has been merged with Z. P. Maruya & Co., Yokohama, the former company securing controlling interest in the latter, which becomes the Yokohama branch of the Maruzen Co., Ltd.

* * *

The Flexible Steel Lacing Co. has removed to its new plant at 4607 Lexington street, Chicago, added space giving opportunity for much better production than formerly.

* * *

The American General Iron Works Co., New Haven, Conn., has moved from 15 Wooster street to 166 Wooster street, in that city, and is installing additional machinery.

* * *

Daniel M. Luehrs, Cleveland, industrial consulting engineer, has removed his office from the Ellastone building to 2015 East Sixty-fifth street.